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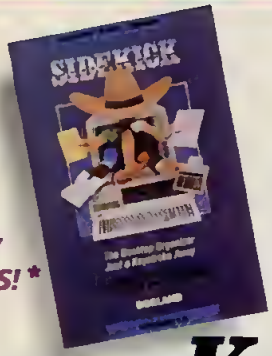
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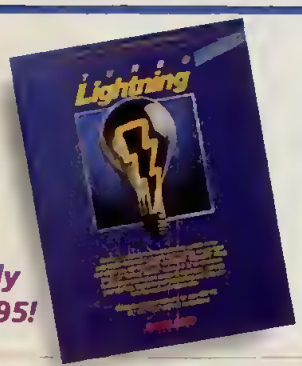
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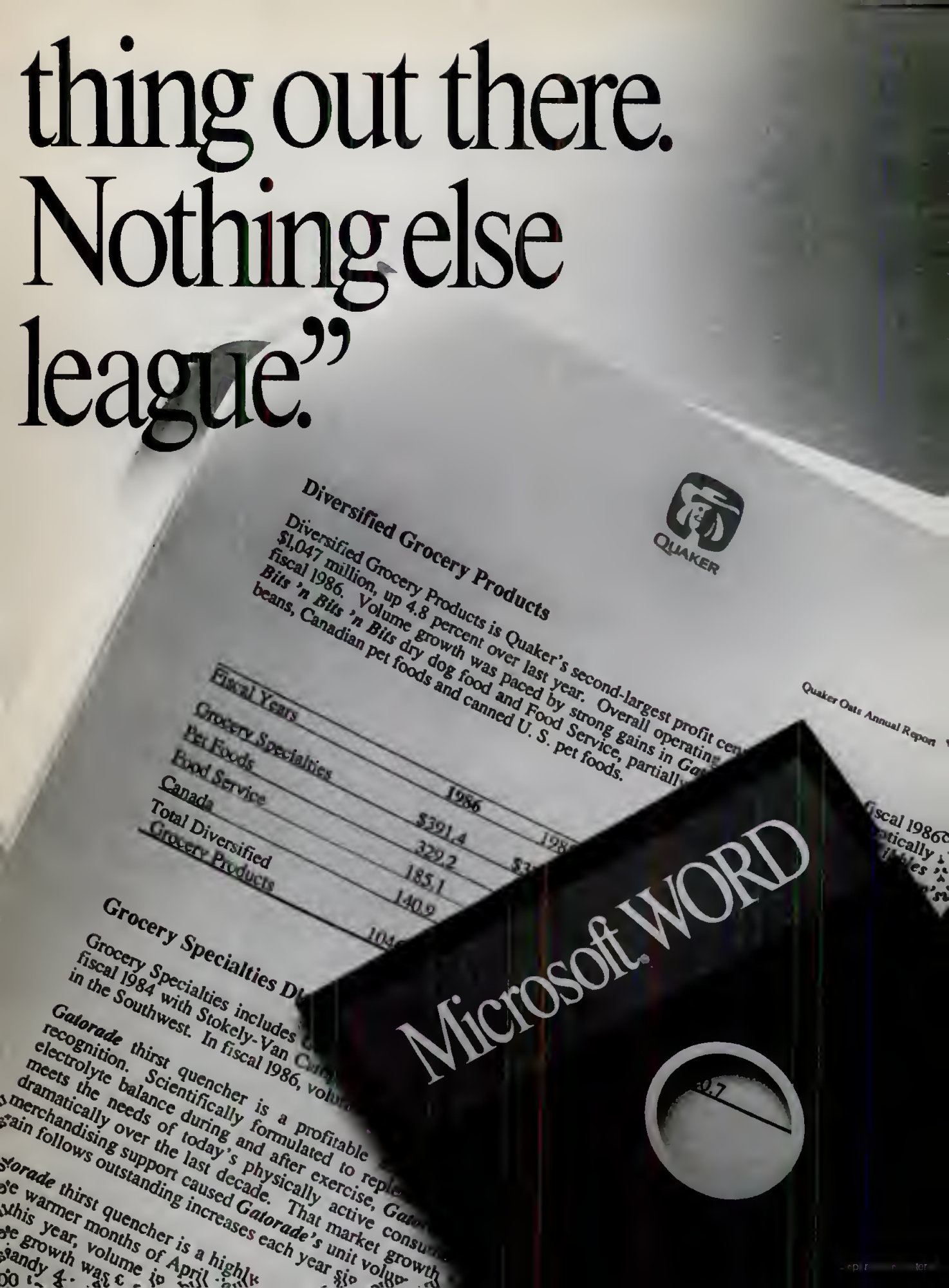
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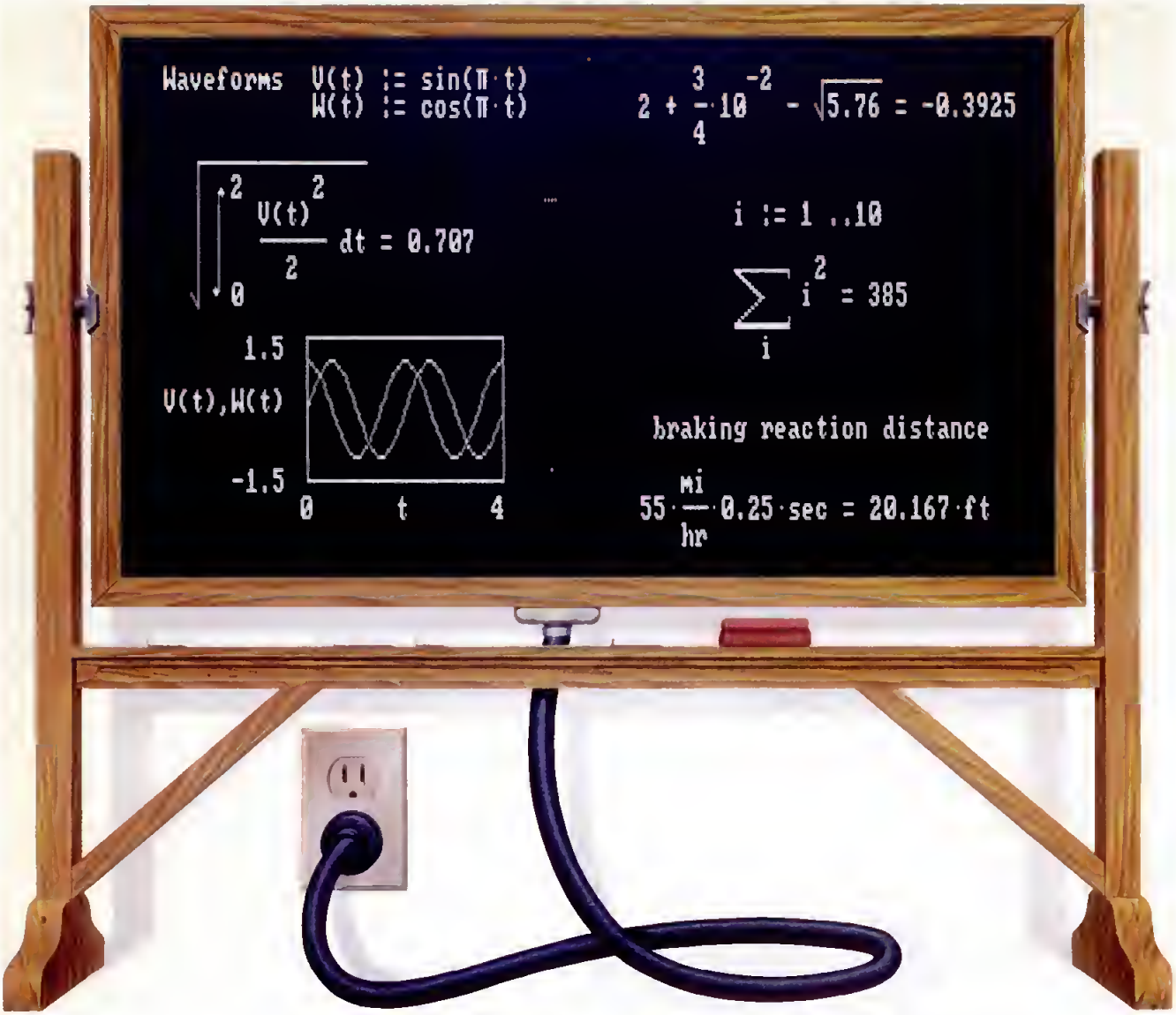
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COVER STORY

And Here Comes HAL
Charles Petzold/Lotus's brand-new English-language *1-2-3* interface is a revolutionary development. At first glance, it seems to be the perfect solution for *1-2-3*'s obscurities, but like the fictional computer after which it is named, *HAL* has a darker side as well..... 109

PFS: Professional Write retains *PFS: Write*'s ease of use while adding sophisticated features at a reasonable price, page 159.





The ALR PC2E/10 MHz, one of our natural selections of 80286-based XTs available on the market, page 225.

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SOFTWARE
Word Processors: More Power for the Money
Robin Raskin/What can you buy in a computer store for $19.95 besides a handful of floppy disks? How about an honest-to-goodness word processing program? Take a look at 18 word processors priced from $14.95 to $199. They may not have all the features of one of the giants, but many offer considerable power for the price..... 127

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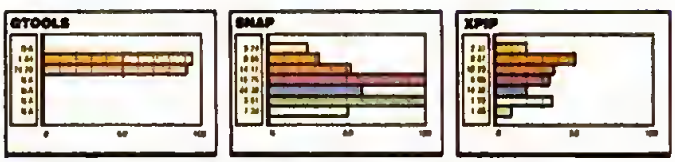
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How DOS-enhancing utilities measure up to our tasks, page 204.

WHAT'S INSIDE



Will last year's fad become this year's computer fashion?

It's not often that *PC Magazine* puts a single product on the cover. But the introduction of Lotus Development Corp.'s *HAL* marks a new direction for software development. *HAL* makes *1-2-3* easier for people who know what they're doing—and it makes doing possible for people who don't. Bill Gross, the head of *HAL*'s development team, is as much a study in contrasts as *HAL* itself. An engineer and top-notch programmer, Gross is also an inveterate practical joker. His offbeat sense of humor surfaced in the beta version of *HAL*, in which, if you typed "open the pod bay doors, Hal" at the command line you got the response "I'm sorry, Dave, I can't do that." (A reference to *HAL*'s namesake, the anthropomorphic computer in the movie *2001: A Space Odyssey*.)

HAL WITHOUT HYPE Lotus has cautiously avoided the words *artificial intelligence* to describe its *1-2-3* add-on, preferring the term *natural-language interface* instead. But the AI implication is there, and that can create a dangerous situation, according to contributing editor Charles Petzold. "With *HAL* you type in words that almost sound like sentences but are just commands broken out into simple words." Although power users will find *HAL*'s shortcuts a blessed relief from the endless keystroking involved in creating complex macros and executing repetitive tasks, Petzold has a cautionary tale for novice *1-2-3* users: things aren't always what they seem when dealing with *HAL*. Petzold plays sphinx and asks "When does increasing a sales figure by 10 percent give you a result larger than 110 percent?"

HAL may be the way of the future, but as Petzold says, "When *HAL* starts *asking* the questions, then you have something significant." For Petzold's comprehensive review, see "And Here Comes HAL," page 109.

Robin Raskin, who coordinated our word processing article, comments that at $14.95 a word processing program is essentially disposable: "You can buy it, try it, and if it doesn't work—trash it." But low price doesn't always indicate low performance; one of our Editor's Choices, Ann Arbor Software's *Textra*, costs only $19.95. For 17 more incisive reviews, see "Word Processors: More Power for the Money," page 127.

"The In-Between Machines: 80286-Based XT Compatibles" is a look at a new mutation in the computer gene pool. Contributing editor Winn L. Rosch takes the Darwinian approach and speculates on this creature's evolution and its chances for survival. Reviews of four XT/AT hybrids begin on page 223.

FIRST LOOKS

FIRST LOOKS
Hands-on reviews: Lotus's *Metro*; Cheetah's $499 386 plug-in card; ChipSoft's *TurboTax*; Comco's $289 2,400-bps modem; Maynard's Suprise! PC no-slot speed-up board; new dot matrix printers from Panasonic and Olympia; *Squish*, a file-compression utility; and *Inset*, for merging test and graphics.....33

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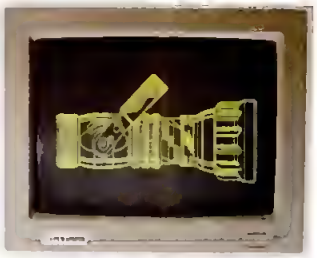
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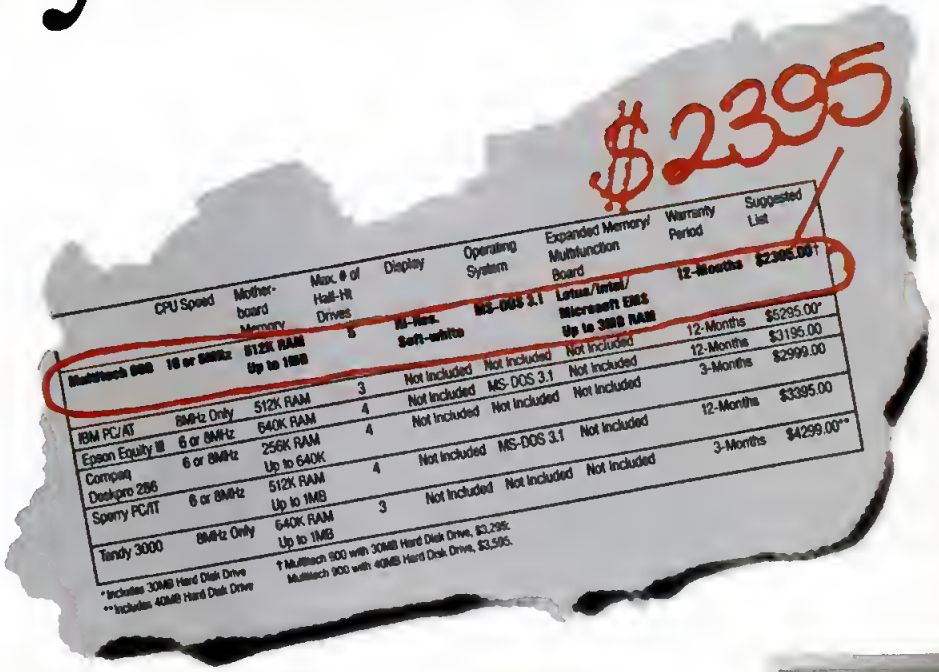
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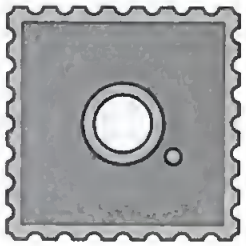
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CIRCLE 175 ON READER SERVICE CARD

LETTERS TO PC MAGAZINE



COMPAQ DESKPRO 386

In reference to your November 25, 1986, feature story on the Compaq Deskpro 386 ("Compaq Leads the Way to Speed and Compatibility," *PC Magazine*, Volume 5 Number 20), there is no doubt that Compaq has brought off a technological coup and that the new machine is a marvelous development with the potential to be even better when appropriate software is developed. But I wish to take issue with Bill Howard and William G. Wong's proposition that the Deskpro 386 represents the "future of personal computing." I am prepared to believe that it represents the future of business computing, but I cannot believe that the millions of truly personal computer users have any need for so much power.

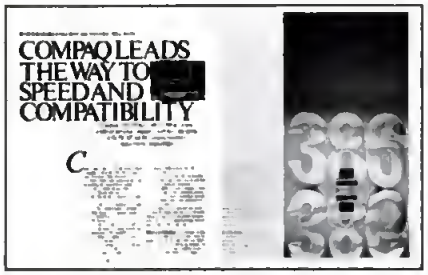
Take me as an example. I have ordered a 10-megabyte hard disk and I would like some more RAM, but it is ridiculous to think that I might make use of 40 megabytes, let alone 130. I am willing to bet that a sizable majority of personal computer users are in the same boat.

George L. Trigg
Brookhaven, New York

Bill Howard replies:

Others have suggested that once personal computers reach a certain level of power, they should be given a new name, such as "deskframe." Why not just recognize that technology makes personal computers more potent every year, and if you don't need the power—yet—just keep using what you have. You'll be amazed at how fast you fill up a 10-megabyte disk, for instance, and wish you had ordered a 20 or 30.

However, someone who's opposed to progress and wants to make an issue of it would find the Deskpro 386 with a 130-



megabyte hard disk the ideal personal computer to maintain a massive mailing list for the International Society of Computer Luddites.

I feel I must object to the cover headline on the November 25 issue, which reads "Compaq: The New Leader!" (*PC Magazine*, Volume 5 Number 20). I have always considered Compaq to be the true leader in the personal computer field. I'm sure I could be challenged with a barrage of sales figures or release dates, but these are misleading. I contend that by providing reliable, innovative, and all-around delightful machines, Compaq has always led the way in personal computer evolution. I am delighted that Compaq is not resting on its laurels but, with the introduction of the Deskpro 386, is forging ahead in its quest for the ideal PC. Whether or not others choose to follow the exemplary lead set by Compaq is a moot point.

J. Lawrence Buell IV
Chicago, Illinois

Yes, the new PC-compatible machines based on the Intel 80386 microprocessor are fast and boast advanced features ("Compaq Leads the Way to Speed and Compatibility" and "Intel's 32-bit Wonder: The 80386 Microprocessor"). However, I am holding off on buying any 386-based machine because of three arguments based on the following three letters: I, B, and M.

For starters, how will IBM implement the ROM BIOS on its 386 PC? If the new extensions are very different from what Compaq, Zenith, and others are doing on their 386 ROM BIOS chip sets, it could be trouble for the clone makers.

Second, how will IBM implement the system board architecture on its 386? The 80387 math coprocessor connections are definite, but it's anybody's guess as to what type of RAM IBM will use.

Finally, what will PC-DOS 5.0 be like? While the ability to use protected-mode memory on all 286-based machines is for certain, will it be so married to IBM's own ROM BIOS that it will be unsuitable for use on the 386 clones?

It doesn't take a genius to figure out that most of the expansion board makers are holding off on making memory expansion boards for the 386-based machines until IBM unveils its machine. After all, who wants to pander to a plethora of expansion board standards for the 386?

Raymond Chuang
Sacramento, California

Bill Howard replies:

A leader without followers isn't a leader. If IBM builds a non-8088/80286-compatible PC, the problem may be IBM's, not Compaq's or Zenith's or PC's Limited's. While IBM set the standard in 1981, now the PC standard belongs to Microsoft and six to eight million PC owners. Of course, with IBM you never know.

The type of RAM and configuration of the 32-bit expansion slot is but a means to an end—performance. The ASTs and Intels of the world aren't making memory

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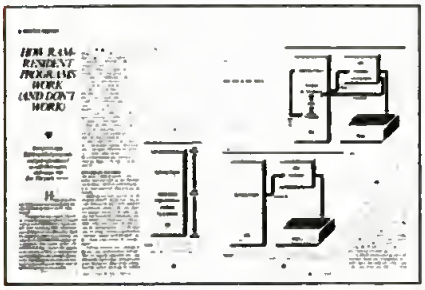
■ LETTERS

boards for the Deskpro 386 because you need only one memory expansion board to reach 10 megabytes, and Compaq already builds it.

William G. Wong replies:
A PC-compatible IBM 80386 machine probably will have its own 32-bit bus but will also have the 8- and 16-bit AT bus. The 32-bit bus is appropriate for memory, but there will be very few devices that attach directly to it. As for the memory technology used, who cares! It only has to work with the machine you have. Also, the 80287 will perform very well until the 80387 comes along.

RAM RAP SESSION

I thoroughly enjoyed reading your articles about RAM-resident programs, particularly Charles Petzold's "How RAM-Resident Programs Work (And Don't Work)" (*PC Magazine*, Volume 5 Number 20).



Having spent nearly 6 months wrestling with the problems of performing disk I/O within RAM-resident programs, I got a big kick out of reading how Mr. Petzold encountered these same difficulties while he was immersed in the RAM-resident world. It is clear from his writings that he is very knowledgeable in this area.

However, I would like to pass on to him and to your readers the solution I finally found to allow me to perform disk I/O within a RAM-resident program. After much effort, I believe I have come up with a fairly viable spooler-to-disk program called *Disk Spool*, which uses BIOS interrupt 13 calls instead of DOS calls. In fact, I challenge Mr. Petzold to take Version 3.0 of *Disk Spool* and try to make it hang, even when doing a TYPE command.

Mike Samule
Budget Software Co.
Denver, Colorado

Charles Petzold replies:
That's certainly one solution, but it also has problems. If you had written your program before DOS 3.0, for instance, it would have gone berserk trying to figure out the 16-bit FAT on the AT hard disk. And how would your program work with something like my Bernoulli Box, which doesn't have a BIOS interrupt 13 interface? I can't try to crash your print spooler if I can't even run it.

Charles Petzold's article "How RAM-Resident Programs Work (And Don't Work)" conjured up visions of little Reddi Kilowatt–type characters with white and black hats running around inside my computer. What a hoot! Thanks for the great information and entertainment.

Mike Evans
Columbus, Ohio

I would like to compliment Charles Petzold on a job well done. His article "How RAM-Resident Programs Work (And Don't Work)" provided a clear explanation of a subject that, while affecting many, is understood by few. As a software engineer with extensive terminate-and-stay-resident (TSR) experience, however, I wish to point out that some of the viewpoints expressed in the article are not gospel truths.

For example, Mr. Petzold states that "resident programs work mostly through unstable tricks and dirty kludges." This does not always have to be the case. From the point of view of DOS and BIOS, there are two types of software: "well behaved" and "ill behaved." Well-behaved software includes those packages that adhere to the published guidelines for DOS, BIOS, and the 80x86 family of microprocessors. Ill-behaved software refers to programs written with disregard for these guidelines.

While the revectoring of BIOS interrupts is not inherently bad, the same cannot be said of DOS interrupts. Since Microsoft doesn't make DOS's source code available, it is impossible to write code that works around DOS because one cannot be absolutely certain how it operates. Thus, any program, TSR or otherwise, that attempts to circumvent DOS outside the guidelines spelled out in IBM's or Micro-

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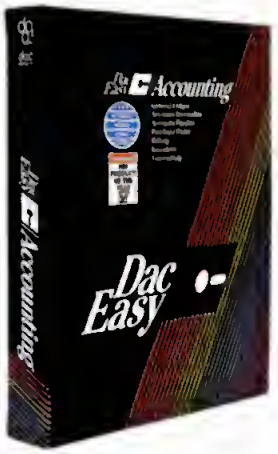
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■ LETTERS

soft's documentation is doing so with "unstable tricks and dirty kludges."

However, TSR programs are successful because they provide users with a benefit that is either difficult or impossible to obtain in any other way. But with the recent bad press that TSRs have been receiving, these same users may now be questioning the prudence of using many powerful, effective, and well-behaved accessories.

Richard L. Hartman
Spokane, Washington

Charles Petzold replies:
On the same day your letter arrived here, I also got a letter from a reader who claimed that a RAM-resident screen-recall program I had written for a PC Magazine *Programming/Utilities column was causing his floppy disk drive to malfunction temporarily. For the life of me, I couldn't think of anything my program did that would affect the disk drive. But could I really claim he was mistaken? I'm not that sure. I've seen stranger things happen with RAM-resident programs.*

Certainly some TSRs are cleaner than others, with printer utilities being among the cleanest. And yes, a few well-behaved RAM-resident programs can exist quite comfortably in a PC. But, you let one in, and then another, and then a few more, and pretty soon DOS has about as much authority as a substitute teacher in a class of fifth graders on the first really nice spring day.

INSTANT WIPEOUT?

I would like to take exception to Stephen Manes's column "The Famous Software School" (*PC Magazine*, Volume 5 Number 19). Although he complains about how easy it is to accidentally exit some of the popular programs and lose data, the examples of instant wipeout that he cites in *1-2-3* take three keystrokes each. This is hardly instant. I would much rather depend on my own common sense in performing frequent saves than climb a mountain of submenus just to leave a program.

Brian Danenberg
San Francisco, California

Stephen Manes replies:
Mr. Danenberg's is the kind of "common sense" that leads people to run red lights across eight lanes of traffic. Hey, why be slowed down by a mere traffic signal . . . ? (KEE-RASH!)

Perhaps our correspondent is the one 1-2-3 *user who hasn't been burned by the current lame setup. Neither mountains nor submenus are needed to repair it: what's needed is a simple "Abandon edited spreadsheet? (Y/N)" prompt that appears only when changes have been made and the current sheet is about to bite the dust. I'm told even the much-touted* HAL, *which will amend most big errors, isn't quite intelligent enough to resurrect a flaming /QY trash-out.*

CORRECTIONS/AMPLIFICATIONS

The correct address and phone number of UTLAS Corp., maker of *DisCat*, *DisCon*, and *LAWMARC* (in the sidebar "CD-ROM Applications," "Optical Overview: What's Coming in CD-ROMs and WORMs," *PC Magazine*, Volume 5 Number 17), is 1611 N. Kent St., Arlington, VA 22209; (703) 525-5940.

The correct phone number for Nantucket Corp., maker of Clipper (First Looks, *PC Magazine*, Volume 5 Number 20, page 59), is (213) 390-7781.

The last three lines of the Toshiba T1100 Plus review on page 123 in "DOS Travels Better Now," (*PC Magazine*, Volume 5, Number 22) were misprinted to the bottom of column three. The Zenith Z-181 Portable PC review continues on pages 124, 125, and 126.

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Plib™ 86

Plib86 is an object module librarian for Microsoft and Intel format object modules and libraries. With Plib86, you can add, delete or extract modules to or from libraries, and explode a library to its component modules with one command. Plib86 also produces program cross-reference listings in various formats to a disk file, screen or printer.

Originally listed at $195, Plib86 is now included with Plink86*plus*.

Ptel

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Pasm™ 86

Pasm86 provides both quick assembly and superior syntax checking, plus a wealth of other features and utilities to maximize programming productivity. It is a fully MASM-compatible 8086 macro assembler that supports 8087, 80286 and 80287 operating code mnemonics. Features include ability to define local symbols in the current procedure, assemble files with up to 15,000 symbols, define symbols at assembly time, obtain listings of error lines only, with warning messages on questionable statements. Pasm's comprehensive documentation includes detailed descriptions and examples of each processor instruction. Now includes Pfix Lite, a subset of Pfix86*plus*.
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Pfinish helps to "fine-tune" a software product by identifying inefficient or unnecessary sections of code that need to be rewritten for maximum performance. It analyzes your program during execution, producing reports and histograms that give a snapshot of which routines were reached, their callers, how many times each is executed, how much time is spent in each, how many instructions are executed in each, and more. Histograms and tabular reports, sorted by address or symbol, may be written in any page width or height, to a file, the console, or the printer. Pfinish, unlike other "profilers", can use symbol table information to produce much more meaningful analyses on overlays and interrupts.
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Pmaker™

Similar to the Unix MAKE utility, Pmaker keeps track of which modules in a program are changed, and recompiles, reassembles, and relinks those modules to produce a finished product—all with a single command. An essential tool for managing large, complicated, or distributed programming projects, Pmaker is easier to use than similar products, which require you to create lists of all your input files. Pmaker includes a utility that automatically creates and edits such lists based on answers to a few simple questions. Pmaker works with any compiled language, linker, or other tool you use.
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All functions are in separate modules, only those used are linked. Only buffers holding on-screen or temporarily obscured windows occupy RAM, others released dynamically. Best overall rating and fastest display in Bill Hunt's 7/85 *Tech Journal* review of five windowing products.

Windows for Data comprises all of Windows for C but takes in data through the windows as well. At the high level a single function lets you specify prompt string, field length, data type, screen location, picture, target variable, then sets lesser functions scurrying to get and process a user's input. There are utilities to get system date and time, mess with strings, create your own masks for fields.

Field options can require entry, prevent entry, permit insert or overtype, beeping on invalid or overflow keystrokes, and attachment of field-specific help messages and functions you want called to display messages or validate entries. And you decide which keys will clear a field, jump to the next or prior, quit, etc. Options diverse enough that a set of "fields" can be made to behave like a Lotus™ menu.

Specify Compiler	List	PC Brand
T0100 Windows for C	$195	$149
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MICROSOFT C 4.0 *A Great C Battle Rages and You're Winning*

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The CodeView™ debugger, free for a limited time, uses windows to show every thing on one screen: source alongside disassembled object, variables, stack and registers. Drop down windows—use a mouse if you like—obviate learning of commands. "A source-level debugger that puts the rest to shame" (Dobb's).

Microsoft C now has five memory models for code and data, plus non-library support for another thirteen, and boasts alternate math packages for speed versus accuracy, with or without 8087/80287 chips. A big plus in multi-language settings: call from this C any routine written in later versions of M'soft Pascal, FORTRAN, or Macro Assembler. Object code of all four may be intermixed come link time or commingled into libraries.

Both linker and library manager are part of the package, as is the "make", a UNIX™ name for a smart batch program which knows to expend minimum effort to rebuild any size of project by compiling and assembling only elements affected by new or changed modules.

It is reportedly used by Lotus, Ashton-Tate and, fittingly, Microsoft itself to develop Windows. Dobb's calls it "the best MS-DOS C development environment value today [for] virtually any kind of program conceivable." 320k suggested.

Ask for	List	PC Brand
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C-TREE *B-Tree File Manager, Source Code, No Royalties!*

C-tree is sturdy code that has weathered many seasons of prolonged and widespread use. It comes in C source, so you can modify it to fit a special case. No royalties provided you bind it into your binary application.

C-tree's design splits nodes to allow any number of users to access an index file simultaneously even when updates are in progress. So multi-user configurations and adaptation to networks are possible. Record-locking routines are provided for DOS 3.1/3.2, UNIX and XENIX.

Thanks to source code which does not deviate from the K&R standard, C-tree can travel. Tests in many environments prove that C-tree gives your application a ticket to anywhere.

C-tree permits any number of keys for a data file, supports duplicate keys, alphanumeric or numeric, supports files of variable record length, multiple keys in one index file, and keys of variable length. Both high level ISAM routines which handle details with minimum coding, and decomposed step-by-step functions you can access directly. It's comprehensive.

Ask for	List	PC Brand
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CURSES *Unix Style Screen Management*

Curses from Lattice™ manages the screen of the PC like Unix™ curses. Library of 84 functions and macros parallels Unix with matching parameter lists. So Unix programs are at home on the PC, and vice versa. Keeps any number of screens in memory, supports color, vast function set to get characters, wrap lines, scroll, blank lines, highlight, etc. Like Unix refreshes screen only on your command. Ask for L0850. List $125. Here $99. With Source L0860, $250/$199.

dBC *Lattice Library Maintains dBASE Compatible Files With the Power and Speed of C*

dBC™ links C to dBASE. It creates and maintains files and their indexes which exactly replicate dBASE file design. So dBASE can read and update them. And the reverse. dBC can use any files created by dBASE. Now C and dBASE can operate on the same data bases interchangeably.

That opens up the widespread culture of dBASE installations to exploitation by C programmers. Tap that market, avoid the resident dBASE language, and gain the advantages of C with this single product.

dBC's functions parallel all dBASE's file handling commands, many decomposed to give closer control. Each backed by demo source files on disk.

Use dBC for custom work for clients, or on its own. It's a complete ISAM file manager for C whether or not dBASE will be used in tandem, supports all four memory models, and can have sixteen index and data files open. Big discount to buyers of both dBASE II and III versions. Specify Lattice, Microsoft 3.x, or DeSmet.

Versions		List	PC Brand
L0II	For dBASE II	$250	$195
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L0III	For dBASE III	$250	$195
LCIII	With Source	$500	$390

PANEL *Feature-Laden Screen Design Tool*

Writing your own screenware can blow completion dates and profits. Panel™ works with you interactively to set up foolproof screen displays and data entry forms rapidly. Output is C source code.

Not just single plane layer your screen designs with up to ten overlapping images. Background pop-up lists, help boxes, and alternate input fields.

Panel builds in a user interface for keystroke movement within and between fields, supplies validation routines for checking user field entries. Diverse attributes may be selected for any field — size, data type, color, conversion of input to upper case, clearance of existing data when new entry is started, masks for standard formats (eg. dates), phrases which fill in when their first letter is typed, multiple-choice lists from which to choose by cursoring a highlighted bar. Fields may be multi-lined and scrolled if larger than the screen space allotted them. Specify S0400 & Compiler. List $295. Us $229.

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TODAY's TOP QUALITY AIDS TO PROGRAMMING PRODUCTIVITY

GREENLEAF FUNCTIONS *Bountiful Harvest*

C source, assembler source, and binary libraries of 225 functions for many compilers. Emphasizes tight functional groupings to minimize loading code which your application may never use. Manual helps select functions, bulletin board, too.

A sampling: *DOS* extensions for file and directory manipulation. *Screen* to select mode, page, monochrome or color, palette, cursor shape, positioning, clearing and scrolling, pixel get and put, read light pen. *Strings*: Center, justify, etc., efficient list operations which add, delete, sort string pointers for top speed. *Other*: graphics character primitives, keyboard status, function key assignment, time/date, read registers and memory size, peek and poke. Mature best seller. Specify S0770 & Compiler. List $185. Here $139.

GREENLEAF COMMUNICATIONS *Hello World*

Want your application to communicate with other users or remote date bases by asynchronous communications built right into your C programs! Even if you don't need it now, that's a skill to have at the ready!

120 functions *and demo programs in both C and assembler source code* set up separate transmit and receive ring buffers for up to 16 simultaneous channels. Interrupt driven so you can halt an incoming record, display it, file it, let the user edit it, then continue. Goodbye separate communications software.

Supports up to 9600 baud, ASCII or binary, any parity or word length, 8250 UARTs, Xon/Xoff and Xmodem, WideTrack receive. Specify S0750 & Compiler. List $185. Us $139.

INTERACTIVE-C

Compiler-Compatible Interpreter, Editor, Debugger

Earlier C interpreters were miraculous compromises. Interactive-C shows how far C interpreters have come. More than an interpreter, Interactive-C is a fully-integrated development environment: a complete K&R interpreter bound tightly to its own editor and debugger.

Slice through programming projects like a hot knife through butter. Extensive error-checking insures immediate detection of program misbehavior. State of the art debugging tools include breakpoints, watchvalues, several stepping options and interactive viewing and modification of variables. An Interactive-C exclusive lets you interrupt to edit and "continue" *from* where you left off. Eliminates plodding replays of already debugged code the ball and chain of other interpreters.

Operate Interactive-C using adjustable edit, command, and status windows. Toggle a second screen showing only your program's output: never any crowded intermixing. Or boost productivity with twin CRTs. Load object code of functions you have already compiled. Or of commercial libraries. Interactive-C has immediate *mode* syntax checking: both as you type and run, and cursor positioning precisely pointing at an error: not possible with incremental or pseudo-compilers which leave source code behind.

100% compiler compatible—right down to header files and library calls. Port programs between Interactive-C and your compiler with no modifications whatever—not even tricky areas of dynamic memory allocation and I/O.

Specify	List	PC Brand
E950 & Compiler	$249	$219

DAN BRICKLIN'S DEMO PROGRAM

Storyboard Your Program

The Legendary One has created Metaphor Two when the rest of us are still on Zero. Dan's first was the original electronic spreadsheet (VisiCalc™). This one is for programmers.

Words don't express program ideas because programs are screens! Dan's Demo creates slide shows. Create a screen—a snapshot of your planned product as it runs. Anything goes: words, borders, box rules, inverse and underlining of monochrome, fore- and background color. Copy this "slide" to an *empty* screen. Change it a little, to show the next instant of run-time. Do it again. Presto, a whole slide show of your program in action.

All 250 characters and attributes are available from scrollable lists which pop to the screen. All commands are layered in Lotus-style pop-up menus. Frequent choices mapped to function keys as well.

80x25 character mode, not bit-mapped.

Screen areas can be blocked for cut and paste or filled with color or characters, even blink. Slides can overlay on others, can be shuffled, deleted. Slides can proceed at time intervals or branch anywhere in the slide sequence depending on user keyhits.

Invaluable to prototype the program you are about to write, to position the labels, choose the color decor, smoothe out the keystroke interface. Or load the "capture" utility and snapshot the screens of any running program for an instant slide show.

Each copy entitles you to redistribute fifty of the slide projector program that runs demos. Plain manual, no binder keeps price of big product small. "Might become *the* essential tool in ... user interface prototyping." *Tech Journal*. Ask for N0100. List $75. US $69.

BASTOC *OPTIMIZES!*

Translates BASIC Into C

For a trifling price, BASTOC™ moves truckloads of BASIC code over to C. It's a translator which takes in Microsoft Extended BASIC and emits pure K&R C for Lattice 3.0. It will optionally convert your program into a single monolithic C function or decompose it into separate functions, one for each GOSUB label.

Version 2's optimization dramatically reduces execution time. Converts to integers those variables in BASIC programs which do not need floating point. Where BASIC uses full assignment statements to increment counters, BASTOC converts to C's compact form. Strings dynamically allocated, ridding your application of BASIC's catatonic halts for garbage collection. Creates structure of even convoluted BASIC code. Huge worksaver.

Ask for	List	PC Brand
S0375	$495	$399

Shopping List for the Power Workbench

	LIST	US
ASSEMBLERS & DEBUGGERS		
Advenced Trace-86 *Morgen, ASM Interpreter*	175	119
Codesmith-86 *Dubugger by Visual Age*	145	99
CSD Debugger *C source level by Merk Williams*	75	55
C-Sprite Debugger *by Lettice, source level*	175	139
Microsoft Macro Assembler *with Utilities*	150	109
PASM86 *by Phoenix, Macro Assembler*	195	144
Periscope I Debugger *Dete Base Decisions*	295	235
Periscope II *Dete Base Decisions*	129	99
Periscope It-X *software only*	115	74
Pfix86 Plus *by Phoenix, Symbolic Debugger*	395	279
BASIC LANGUAGE		
BetterBASIC *Summit Software*	195	165
BetterBASIC Utilities *8087 Math Support*	99	85
Btrieve Interface	99	85
Run-Time Module	250	225
Microsoft BASIC Interpreter *for XENIX*	350	295
Microsoft QuickBASIC Compiler *full BASICA*	99	79
Professional BASIC *by Morgen*	99	69
True BASIC *True BASIC Inc*	150	99
Run Time Module	150	99
True BASIC Libraries *Btrieve, Asyn, Sort, etc.*	Ver	Call
C COMPILERS		
C-86 Compiler *Computer Innovations*	395	289
Lattice C Compiler *from Lettice*	500	299
Let's C Compiler *by Mark Williams*	75	55
with CSD Source Level Debugger	150	105
MWC-86: Merk Williems C Development	495	369
Microsoft C Compiler 4.0	450	295
C INTERPRETERS		
C-Terp *by Gimpel Software*	300	249
Instant C *by Rational Systems*	500	395
Interactive-C *by IMPACC with debugging*	249	219
RUN/C Professional *from Lifeboet*	250	185
RUN/C *without Loedable Libraries*	120	109
TEXT EDITORS		
Brief *from Solution Systems*	195	Call
Edix *by Emerging Tech. Multi-screen*	195	159
Epsilon *by Lugaru Software, like EMACS*	195	149
FireTime *by Spruce Technology, C syntax*	295	229
Kedit *by Mensfield, similar to Xedit*	125	99
LSE, the Lattice Screen Editor *Multi Window*	125	100
Pmate *by Phoenix, with Macros*	195	149
Text Menegement Utilities *Grep, splef, diff, etc*	120	100
Vedit *by Compuview*	150	99
Vedit Plus *by Compuview*	185	129
FILE MANAGERS		
Btrieve *by Softcraft, no royalties*	250	195
Btrieve Network *by Softcraft*	595	465
C-Tree *by FairCom no royelties, source*	395	329
R-Tree *by FairCom Report Generator*	295	245
C-Tree & R-Tree Combo *by FairCom*	650	541
dBC *dBASE file menager from Lettice*	250	195
with source	500	390
dbVista *single user DBMS by Raime*	195	139
with source	495	399
dbVista *multi-user DBMS*	495	399
with source	990	815
Opt-Tech Sort *Cen sort Btrieve files*	149	105
SCREEN DESIGN		
Curses *by Lattice, UNIX screen designer*	125	99
with Source	250	199
Greenleaf Data Windows *New*	225	169
with source	395	297
source purchased later	225	169
On-Line Help *from Opt-Tech Data*	149	105
Panel *by Roundhill, no royalties*	295	229
View Meneger for C *by Bleise*	275	189
Vitamin C *by Creative Progremming*	150	129
Windows for C *Vermont Creative Software*	195	149
Windows for Data *Includes Windows for C*	295	259
ZView *Data Menegament Consultents*	245	175
GRAPHICS		
Essential Graphics *by Essential, no royalties*	250	210
GSS Graphics Development Toolkit	495	375
GSS Kernel System *by Graphic Software*	495	375
GSS Kernel System *for IBM RT*	795	645
GSS Metafile Interpreter	295	235
GSS Plotting System	495	375
Halo *by Media Cybernetics*	300	219
with **Dr. Halo II**	440	299
Halo for Microsoft *includes all fonts*	595	434
COMMUNICATIONS		
Asynch Menager *by Bleise, for C or Pascal*	175	125
Greenleaf Communications *by Greenleaf*	185	139
PTel *by Phoenix, Binary File Communicator*	195	149
Software Horizons Pack 3	149	119
UTILITY LIBRARIES		
Bleise C Tools Plus	175	125
Bleise C Tools	125	89
Bleise C Tools 2	100	69
C Food Smorgasbord *by Lattice*	150	109
C Utility Library *by Essential, 300 functions*	185	139
Greenleaf Functions *by Greenleaf Software*	185	139
PforCe *by Phoenix, vast library*	475	349
Software Horizons Packages	Ver	Call
TopView Tool Basket *by Lattice, source avail*	250	199
DEVELOPMENT TOOLS		
Code Sitter *by David Smith Software, Profiler*	119	89
C-Worthy *by Custom Design Software*	295	289
C-Worthy for Network *Menus, help, errors*	495	449
Dan Bricklin's Demo Program *Prototyper*	75	69
LMK from Lattice *by Lettice, "make" like UNIX*	195	149
Microsoft Window Development Toolkit	500	365
PC-Lint *by Gimpel Software, after UNIX's "lint"*	139	125
PFinish *by Phoenix, EXE performance analyzer*	395	279
Plink86 Plus *Utilizes memory for overlays*	495	359
Pmaker *by Phoenix, like UNIX "make"*	125	105
Pre-C *by Phoenix, UNIX "lint"-alike*	295	208
Ptentasy Pac *six Phoenix products*	1295	895
OTHER TOOLS		
BASTOC *by JMI, convert BASIC to C*	495	399
BASIC-C *BASIC's functions added to C*	175	139
The HAMMER *by OES Systems*	195	139
Report Option *by Softcraft, Btrieve Report Gen.*	145	128
Xtrieve *by Softcraft, Query Utility for Btrieve*	245	220
FORTRAN COMPILERS & UTILITIES		
ACS Time Series *by Alpha Computer Service*	495	405
Forlib-Plus *by Alpha Computer Service*	70	45
Microsoft FORTRAN *Links with Microsoft C*	350	219
Microsoft FORTRAN *for XENIX*	895	546
RM/FORTRAN *by Ryan McFarland*	595	Call
Scientific Subroutine Peckage *by Alpha*	295	239
The Statistician *by Alpha Computer*	295	239
Strings & Things *by Alpha Computer*	70	45
OTHER LANGUAGES & UTILITIES		
Microsoft COBOL Compiler	700	499
Microsoft COBOL Compiler *for XENIX*	995	795
Microsoft COBOL Tools *with Source Debugger*	350	259
Microsoft COBOL Tools *for XENIX*	450	333
Microsoft Lisp *New Common Lisp*	250	189
Microsoft MuMath *includes MuSimp*	300	199
Microsoft Pascal Compiler *Links with M'soft C*	300	199
Microsoft Pascal Compiler *for XENIX*	695	546
PDisk *Phoenix's new disk menager*	195	148
RM/COBOL *by Ryan-McFarland*	950	Call
RM/COBOL 85 *ANSI 85 COBOL*	1250	Call
Source Print *Aldebaran's diegrammar*	139	109

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RYAN-McFARLAND FORTRAN

A Mighty Fortress Is Their FORTRAN

NEW!

Picking over features of rival products is not necessary if FORTRAN is your need still the citadel of scientific and engineering work Ryan-McFarland has left the competition battering at the gates

RM/FORTRAN™ is a complete implementation of FORTRAN-77 (ANSI X3 9-1978) the only PC FORTRAN certified by the General Services Administration at the highest test level The reason it's a big mainframe compiler moved to PCs with the bonus that mainframe and mini applications can wander between environments

Now on your PC you can develop large applications, with programs up to 640k (bigger using overlays) arrays over 64k and using a long list of VS, VAX and FORTRAN-66 extensions you may have grown fond of — long symbolic names, "include" IRT bit functions — because R M has left out nothing

But what really sets RM/FORTRAN apart is optimization The compiler reduces the number of instructions to the minimum which will actually execute, and even takes advantage of each processor's features to deliver lightning-fast object code It runs 30%-40% faster than Microsoft 3 2, and could make your mainframe not worth the trouble

Comes with an interactive symbolic debugger like that accompanying IBM VS FORTRAN Plink86 subset, has a cross reference compile option, supports assembler and C subroutine calls IEEE floating point, 8087 and 80287 chips

Compiler's documentation ease of use speed of execution and debugger facilities place it first for recommendation said the *Tech Journal* (10/85)

R M has been writing FORTRAN compilers for IBM DEC, etc for 20 years There is no greater expert

Ask for	List	PC Brand
I0300	$595	Call

RUN/C PRO

C Interpreter Links Binary Libraries

Run/C comes in an apprentice and pro version The professional model dynamically loads and unloads multiple binary function libraries like C-Food Smorgasbord™ and Halo Graphics™ - potentially any library compiled with Lattice's large model Inside this interpreter your C program can reach for functions in the best of commercial libraries

This C interpreter behaves like PC BASIC meets WordStar® Use fullscreen editing to create a program RUN it If it stumbles LIST it, EDIT it RUN it again fix it again Use familiar commands like LOAD, MERGE SAVE FILES, even TRON and TRACE

Ideal for program development Put up code at high speed try out things devil may care let RUN/C find your malaprops Blast away until tight little code segments are undyingly faithful

Manual shows how to develop the interface to a commercial library, using the Lattice compiler (a must!) Link your own function archive the same way (320k minimum, 512k recommended to fit libraries.)

Ask for S0950 List $250 PCB $185

ZVIEW

Screen Design Aid

A complete package for screen design with full windows management as a bonus! Easy creation of screens with complex validation, such as range checking or required/optional data Powerful Screen Paint utility for creating or editing applications screens Built in security levels set at run-time, control read or read/write access by field or screen Automatic help screen processing for run-time aid per field or screen Applications regain control during field tabbing, allowing run-time on-screen transaction processing or flow control Run-time functions include Screen Read and Write with automatic transparent data conversion from screen image to data storage, Field Editing Help Screen Processing, even a capability to change any field characteristic at run-time, plus Window Push Pop and Scroll Versions for Lattice Microsoft and Aztec C Automatic free updates to registered users No run time royalties List $245 PC Brand $175

LATTICE C COMPILER

Major Upgrades to the Best Selling C Compiler

Lattice now embraces key UNIX™ enhancements which have entered the language since K&R void functions returning no value, enumerated data types to assign stepped values to variables, data passing between structures by assignment

The greatly expanded libraries (325 functions!) enable the file sharing and record locking provisions of DOS 3 1 provide a full complement of transcendentals, and a host of utilities to mimic the UNIX and XENIX™ environments.

Lattice 3 0 defaults to the ANSI proposed standard when you need strict adherence but command line options restore leniency And it adopts ANSI checking of external function arguments by data type to kill bug swarms when modules join up at link time

Lattice now delivers smaller EXE files, boasts very fast link times and a more efficient aliasing algorithm New options generate code to use 80186 and 80286 features, 8087 of course sensed and utilized Lattice has enjoyed pre-eminence so long that developers have created far more snap-on tools for Lanice C than any other compiler William Hunt's *PC Tech Journal* review of 12 compilers awarded Lattice the only "very good" rating for add-on library availability

Ask for	List	PC Brand
S0100	$500	$299

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BETTER BASIC

Convert Microsoft BASIC. Structured, Compilable.

Combines the familiarity of BASIC with the best features of C Pascal and Modula 2, yet BetterBASIC is 100% compatible with Microsoft's GW™ BASIC and IBM BASICA including graphics, sound, and assembly language calls So load your old programs and RUN SAVE and they are converted automatically to BetterBASIC!

It's big Needs 192k programs can go to the PC's full 640k It's comfy Behaves like M soft BASIC at the interactive level with a full-screen editor, direct statement execution and always poised to RUN It's fast Each statement checked and compiled once, not every time encountered Sieve runs *6 times faster* than with M soft

C-like structures house file records so goodbye to FIELD, MKI$ CVD LSET etc Named "procedures" replace GOSUBs to linenumbers Lots more features built-in linker for compiled modules, trace debugging breakpoints, cross-reference command, 32k strings DOS and BIOS calls and interrupts recursion Run-time module stores object code for redistribution

Ask for	List	Us
S1200 BetterBASIC	$195	$165
S1201 Run-time Module	$250	$225
S1202 8087 Interface	$ 99	$ 85
S1205 Btrieve Interface	$ 99	$ 85

GSS GRAPHICS SYSTEM

Leave the Device Driving to GSS

ANSI CGI STANDARD! PRICES CUT!

GSS™ has reconfigured two components of its comprehensive graphics tools to conform with the ANSI Computer Graphics Interface (CGI) standard

At the heart of the system is the Development Toolkit which contains all language interfaces and device drivers for keyboards mice joysticks tablets printers plotters, cameras, and more Drivers house management of vector graphics (plotters) and bitmaps used by raster input devices (scanners) to insulate the application program from concern for device idiosyncracy No one else has implemented CGI that way It means your programming remains generic just switch drivers and the same program will drive a different device

GSS Kernel™ conforms to level 2b of ANSI's Graphical Kernel System (GKS) and contains all its needed drivers and language bindings Kernel has macro level tools to draw and color an object store the sequential instructions and recreate the object on its own, as well as segment it, transform it etc So powerful a single command may represent several score lower level statements

Plotting has the equivalent GKS tools for graph and chart generation and their captioning hand it apples and oranges say "pie" and it bakes the numbers into a digestible display for screen or plotters

Kernel and Plotting have tools to convert images they create to ANSI Computer Graphics Metafiles (CGMs) a tokenized standard for storing every form of graphic image as data The Metafile Interpreter reads the contents of a CGM and interprets it with full CGI capability for re creation on various devices

Quality software? IBM thinks so They sell the GSS series under their own label

Unit royalties and annual fees have been instituted for redistribution Needs 256k

Ask for	List	PC Brand
GS010 CGI Dvlpmt Toolkit	$495	$375
GS020 Kernel System	$495	$375
GS025 Kernel for IBM RT	$795	$645
GS030 Plotting System	$495	$375
GS040 Metafile Interpreter	$295	$235

BTRIEVE

ASK ABOUT XTRIEVE & RTRIEVE

Queen B-tree File Manager Abdicates Royalties

There's no longer a tithe to incorporate Btrieve™ in applications, a welcome proclamation if royalties would ruin your profit margins. Btrieve takes complete charge of all file creation indexing, reading, writing insertion deletion, space recapture forward and backward searching It builds function call "commands right into the language you use interfaces to C, Pascal, BASIC, and COBOL with sample programs in all four come with each copy

Btrieve has mainframe specifications' Its balanced-tree indexing scheme finds any key in a million in four or less accesses Files may have up to 24 indexes, fixed record length to 4090 characters, indexes up to 255 characters files of 4 billion bytes Can even extend a file across two drives - even two hard disks!

Version 4 x speeds DOS interaction for large multiply-keyed files, enables variable length records of virtually any length verifies accuracy (optionally) with read after write useful in gritty environments, offers password and data encryption

There's also Xtrieve, for Btrieve file inquiry and data manipulation and Rtrieve for report writing All three in versions for any network that supports the MS-DOS 3 1 file sharing function

Ask for	List	PC Brand
S0650	$250	$195
S0652 Network Version	$595	$465

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Licenses: Each price is for a license to use a product on a single computer and does not constitute its ownership We will inquire for you about site licenses Except as otherwise indicated or where "-" follows the Product Code products may be used to create programs for distribution without royalty payments or additional licenses provided said programs do not substantially replicate the products themselves

Compatibility: PC BRANDs standard products are designed to operate with the IBM® PC XT or AT under PC DOS and require no more than 128k of RAM unless indicated Non IBM machines using MS DOS contact manufacturer about precise differences so we can advise

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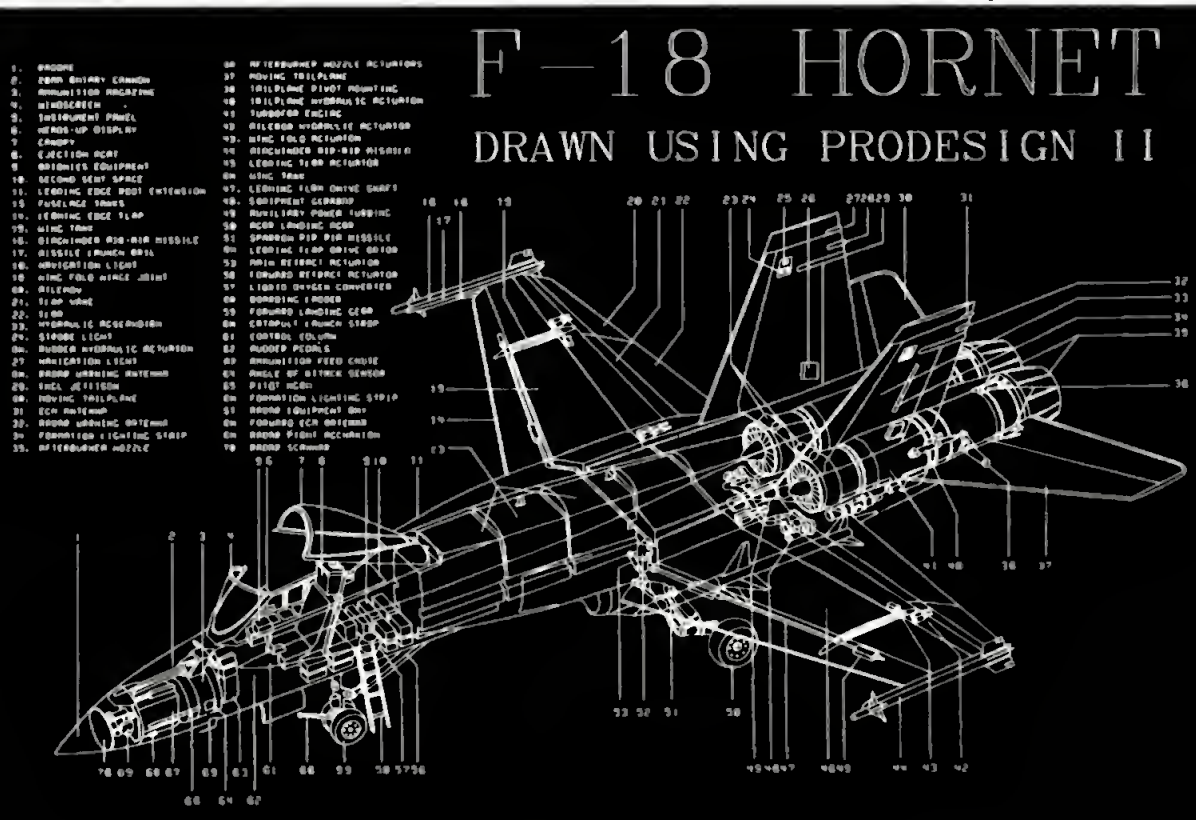
What additional hardware do you need? None! An IBM PC compatible and 512K RAM is all you need. ProDesign II produces high resolution drawings on your dot matrix printer - better than .005" resolution on a IBM/Epson compatible printer. And you don't have to get a mouse or digitizing tablet. ProDesign II is designed for easy and efficient keyboard use. You won't even need a math coprocessor, although it is supported. From a small drawing on a dot matrix printer to an E-Size drawing on a large plotter, ProDesign II is the one to use!

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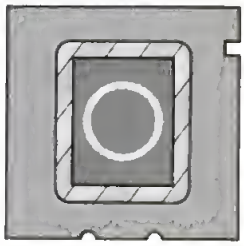
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■ GUS VENDITTO



PC ADVISOR

Help in using a Polaroid Palette with an EGA board, in expanding the power of Turbo Pascal programs, and in using AT boards in an IBM PC-XT Model 286.

POLAROID PALETTE EGA OUTPUT

I have an IBM PC AT with an IBM EGA and a Polaroid Palette. I've held onto my CGA board because the Palette will run only off the CGA composite video output. This means each time I want to use my Palette I have to switch from EGA to CGA.

Are you aware of any video card that will run the Enhanced Graphics Monitor and provide composite video output?

Sam Whitt
San Diego, California

The EGA Wonder video card can generate an EGA or CGA—not to mention a Hercules or an MDA—signal that will drive a Polaroid Palette Plus (ATI Technologies, Toronto, Ontario, Canada; (416) 477-8804; $399). It's brand new and the only card of its kind, as of this writing.

By the way, Polaroid (Cambridge, Mass.; (800) 225-1618) has caught up with the EGA standard, although a new Palette will run you about $3,000; see the review of the Palette Plus in this issue's First Looks section. Curiously, the software that comes with the revamped Palette will let you produce EGA-quality slides on the original model when it's running off the EGA Wonder. Unfortunately, you can't buy a copy of the software without the Palette Plus.

EXPANDING TURBO PASCAL PROGRAM SIZE

I'm developing statistical and modeling software with Borland's Turbo Pascal. While we've been able to overcome the 64K limit on code size by using overlays and a RAMdisk, two other problems have arisen: we need to handle two-dimensional data arrays much larger than is possible within the 64K data space allowed by Turbo. Second, we need to make it easy for users to add their own special-purpose models to the host programs without recompiling the entire system.

Jon Hansen
The World Bank
New Delhi, India

Turbo Extender (*Turbopower Software, Campbell, Calif.; (408) 438-8608; $85*) *will carry you over both hurdles. It lets you create arrays of absurdly huge size, using all the RAM—including expanded memory—you can muster. And if you run out of RAM,* Turbo Extender *can use free disk space as virtual memory.*

Turbo Extender *supports linking with new modules; the trick is to rename your modules with the slug used by the original.*

■ *Turbo Extender* lets you create arrays of absurdly huge size, using all the RAM—including expanded memory—that you can muster.

FITTING AT BOARDS IN THE XT 286

I'm quite pleased with my IBM PC-XT Model 286, but I have an AT-size board I want to install. Is there a solution?

John Lorne
Chicago, Illinois

The opportunity was clear the day IBM introduced its 286-based XT with five 16-bit slots in a case 1 inch too short for AT-compatible boards: sell a kit to raise the chassis's roof, and a world of XT owners will beat a path to your door. Ariel Corp. (Flemington, N.J.; (201) 788-9002) is the first to seize the chance; its $59 kit is essentially an AT-size box that replaces the XT Model 286's shell.

By the way, if you need to buy a 16-bit board for an XT Model 286 and don't feel up to moving the machine's innards, there are two companies now selling compatible memory boards (more are sure to follow): Trade Ventures International (Herndon, Va.; (800) 322-3464) sells the Mem-AT+ for $499 with no memory, and for $1,495 with 3 megabytes (Lotus/Intel/Microsoft expanded memory specification compatible); Computer Peripherals (Newbury Park, Calif., (800) 854-7600) sells the Overachiever board with 128K bytes, a parallel port, two serial ports, and a clock/calendar for $595.

ASK THE ADVISOR

Send your questions to the PC Advisor, *PC Magazine*, One Park Avenue, New York, NY 10016. Please specify the precise equipment you are using when posing questions.

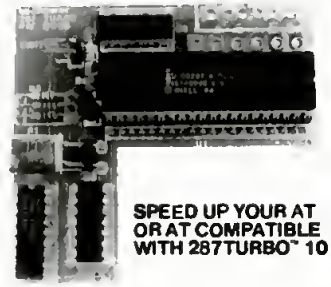
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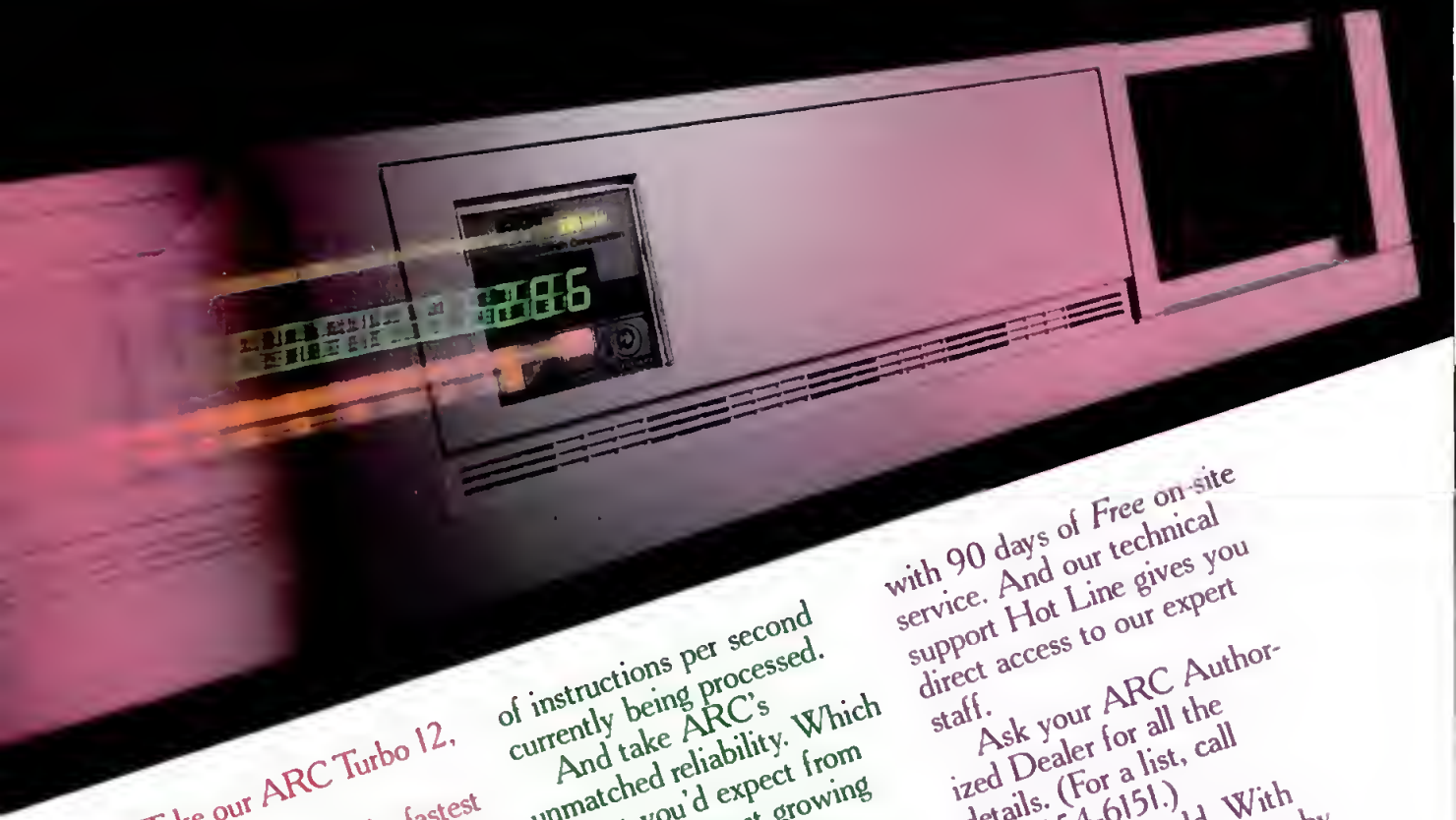
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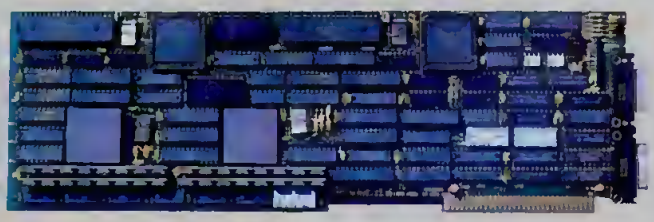
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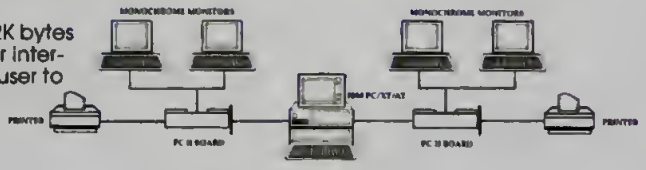
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PC MAGAZINE

FIRST LOOKS

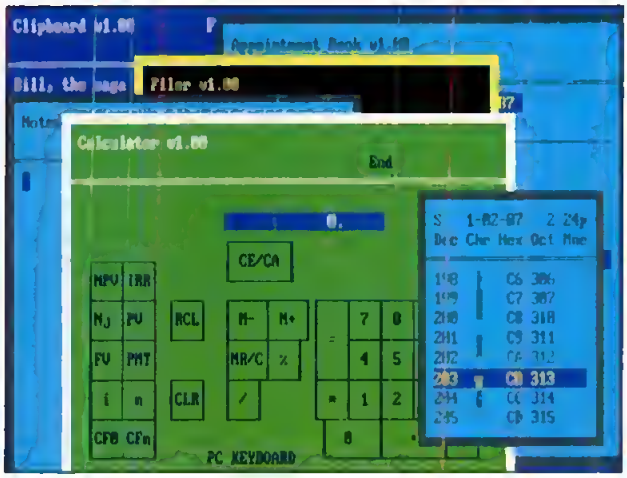
Move Over SideKick, $85 Lotus Metro Does It All

PC HANDS ON

BY BILL MACHRONE

Metro, Lotus Development Corp.'s latest offering, is vying for honors as king of the terminate-and-stay-resident programs. *Metro* itself is a TSR program that manages the activities of other programs. It handles the tough jobs, such as writing to disk and managing the keyboard. The other programs on disk, which Lotus calls accessories, have their own specialties.

The busy, shuttling image evoked by its name is borne out in fact: *Metro*'s accessories include a DOS shell, a phone book/dialer, a calendar/appointment manager, a calculator, an editor, a clock/stopwatch, a clipboard, a notepad, an ASCII character display, a list manager, *and* a comprehensive keyboard macro system. The whole boat lists for $85.



Metro's calculator emphasizes financial functions; the ASCII character converter offers decimal, hex, and octagonal notation.

Here's a brief recitation of what each module does:

The DOS shell accessory, called Filer, looks unassuming, but it includes a print spooler and can format floppy disks. Like most shells, it allows views by file type, size, creation date, or filename. It navigates your subdirectories neatly and

(continues on page 34)

TurboTax Simplifies Tax Season

PC HANDS ON

BY LAURA LOU MEADOWS

'Tis the season when idle moments turn to fear of the Form 1040 and when smart users turn to tax return preparation software for relief.

Last year when *PC Magazine* looked at tax programs (see "The Returns Are In: Tax Software for 1985," *PC Magazine*, Volume 5 Number 4), ChipSoft's *TurboTax* was among the best. With its pop-up menus, invoked in a flash with a slash (/) at any point in the program, I find *TurboTax* is still the easiest personal tax return program on the market to learn and use.

I have tried *TurboTax* out on colleagues — computerphiles and computerphobes alike— and was gratified to sit at their left elbow and see that they can whiz (the philes) or tiptoe (the phobes) through the schedules and forms they need, practically unaided, with relatively few self-induced frustrations.

I won't say the program is idiot proof, but it's as close as tax programs come.

More Schedules, Forms

Revised from last year, Version 4.0 will do, in addition to the Form 1040, 16 of the other most needed forms, ten schedules, a batch of worksheets, and a detailed planner for the coming year. A state and local tax module is available at $30 each for 26 states (including California, New York, New Jersey, Illinois, Pennsylvania, and Massachusetts).

New this year is an on-screen calculator, a notepad, and some brief tax guidance (accessible with a help key). When you are in Form 1040, F5 is programmed as a "hot key," to bring up whatever back-up schedule pertains to the line where your cursor is. After you type in supporting figures, F5 returns you to the original line on the 1040, carrying over your results from the backup schedule. You see the equivalent of the IRS format on-screen, and so you can use the federal government's instruction book

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TurboTax

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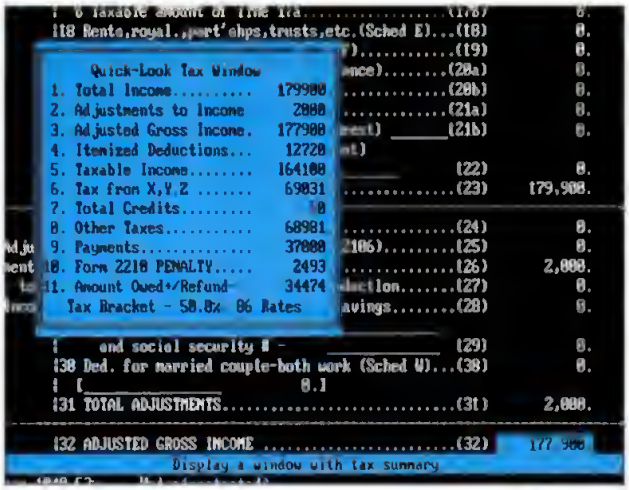
while you follow the calculations on-screen.

My favorite feature of all is the tax window. It tells you a dozen key items including marginal rates and bottom-line dollars at any point as you go along. Using the tax window you can play a quick-and-dirty what-if calculation even with an item that is buried deep in a supporting schedule.

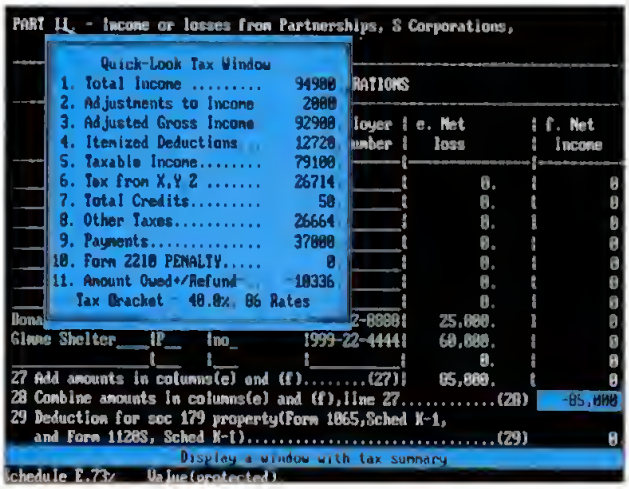
For example, let's say you are an extravagantly paid investment banker, and you want to see where you stand after your first pass at the 1040. You type / and T for tax window. Bad news. Wipe off the tax window with the Esc key and you're back on the 1040. Now you want to know how much you save with that tax shelter partnership loss (the one that won't work anymore, thanks to the Tax Reform Act of 1986). Move to the line of the 1040 for partnership results (line 18) and use the hot-key F5 to bring Schedule E to the screen. This is where you enter the shelter loss. Invoke the tax window again with / and T. It shows the difference now that you've included the shelter loss. All of this can be put up on the screen in well under 30 seconds with fewer than half a dozen keystrokes.

If you are doing more than your own and your brother-in-law's return, *TurboTax* also has a professional version at $295 with batch processing, client letters, laser support, and the works.

TurboTax won't make you an expert at the tax rules, but give it good input and it will get the math right and do a neat job of placing it on the 1040 or in printing out complete supporting schedules.



A tax window can be called up from anywhere for an overview of your liability. Above, a hefty tax bill in Form 1040 becomes, below, a nice refund when you include the effect of a partnership loss in Schedule E.



PC MAGAZINE FACT FILE

***TurboTax*, Version 4.0**
ChipSoft Inc.
4901 Morena Blvd., #801
San Diego, CA 92117
(619) 581-2233
List Price: $65 (includes shipping); update for registered users of Version 3.0, $40.
Requires: 256K RAM, DOS 2.0 or later.
In Short: Simplifies preparation of the Form 1040 and most tax schedules for the tax year 1986. Includes good what-if calculations. Helpful for 1987 planning. Not copy protected.

CIRCLE 445 ON READER SERVICE CARD

Metro

(continued from page 33)

displays information such as the amount of space taken by the files in a subdirectory. The view option displays the contents of text files in the Filer window.

The clock module, called Watch, is the most thorough I've seen. It has a hundred separate timers, each of which can be labeled, a countdown timer, and a stopwatch accurate to hundredths of a second. You can grab any of the timers and paste them onto the clipboard or write them to a file for later reference. The time-and-billing crowd will be in its glory.

The clipboard can cut and paste not only from *Metro* applications but also to and from DOS applications. It has a Define Rectangle command that copies text from the program. It can spit it back in rectangular or spreadsheet format. You can run multiple clipboards.

The phone book not only dials your phone but can produce mailing labels, up to six across, in customizable formats. The Show Only command allows you to exclude all but a certain type of name or number with masks and wildcards.

> The clock module called Watch, is the most thorough I have seen.

The calculator, in a nod to the orientation of Lotus's clientele, emulates a Hewlett-Packard 12C financial calculator. It dispenses with HP's reverse-Polish entry system but retains all of its functions and gives on-screen help to boot. It comes with three different keyboard layouts, for the PC, AT, and Enhanced AT. Programmers will miss *SideKick*'s hex calculator, but Lotus may offer it in the future as another accessory.

The list manager is really a two-level text-oriented database with outlining functions. While the Manager's on-screen appearance is free-form, the list manager can sort on a number of fields, making it a powerful priorities and goals manager. It allows you to assign due dates. At the outline level, you organize tasks by type, project, or whatever is most useful to you. You can attach notes to the category labels or to the details within.

The appointment book is a flexible calendar program, complete with alarms, automatic scheduling of recurring meetings, and time bars that show the duration of meetings.

The notepad is a simple text recorder limited to eight pages of 14 lines. You use it as you would a paper notepad, jotting notes and flipping the page. You can print, erase, or write to disk any page or the entire notepad.

The editor is more ambitious than the notepad. Although it stops short of being a word processor, it's adequate for most tasks, including writing the occasional quick batch file or windowing out of your usual word processor.

The keyboard macro processor is, in a word, excellent. It's

Cheetah Plugs In 386 Processing for $495

PC HANDS ON

BY WINN L. ROSCH

In about 10 minutes and with a minimum of tools, you can pop the 16-bit g02g6 microprocessor out of your PC AT and replace it with a state-of-the-art 32-bit 80386 on a special adapter card made by Cheetah International. If you try this quick circuit surgery, the new level of performance you achieve will likely astound you. The $495 you spend on the appropriately named Adapter/3g6 buys you exactly zero extra speed—but that's good.

Multitasking, Not Speed

Based on market research, Cheetah feels that most AT users believe the current generation of ATs is fast enough for their needs. Instead of blasting bytes at subnanosecond rates, power users are eyeing new PCs based on the Intel g03g6 microprocessor for an entirely different reason: its advanced design allows true multitasking—concurrent operation of several independent PC-DOS applications.

Adding the Adapter/3g6 to an AT allows you to do exactly that—take advantage of current (*DESQview*, Version 1.3) and future (new versions of *Microsoft Windows*) operating system enhancements that allow the g03g6 to slice itself into the equivalent of several independent DOS-based computers, each completely isolated from the rest. Using *DESQview*, Version 1.3, and the Adapter/386, for instance, you can currently execute three separate *1-2-3* applications on your AT, sharing data between them.

Easy to Install

The Adapter/386 is a small printed circuit board that measures only 3½ by 3½ inches. On it are a special header that plugs into an g02g6 socket (once the microprocessor is removed), a socket for an Intel g03g6, and the necessary circuitry (principally seven integrated circuits) to adapt the new microprocessor to the hardware interface of the old one.

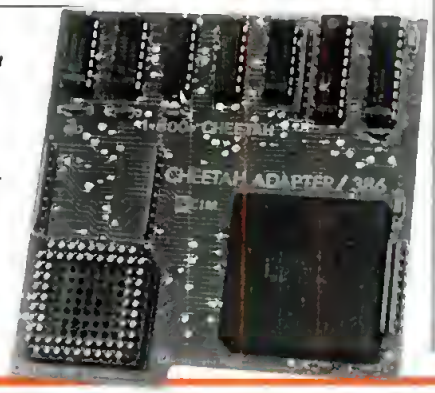
The small board requires no additional power or connections other than what is available in the g02g6 socket. It will work in any model of the AT, the PC-XT Model 2g6, and most compatibles.

Speed Not Increased

System speed is not enhanced because the Adapter/3g6 uses the same 16-bit memory as the original 80286 microprocessor and runs at the same speed as the host computer, which, in later IBM systems, may be limited by the BIOS to 6 or g MHz.

The Adapter/3g6 currently represents the least expensive way to add the powerful advanced features of the g03g6 microprocessor to an existing computer. In addition, when you make the change, you don't lose compatibility: an AT-adapted system ran all of the many programs I threw at it. There's no reason it shouldn't continue to be compatible with all future g0g6, g02g6, and g03g6 programs and operating systems, though no one can accurately predict what IBM will do when it introduces an g03g6-based PC.

The Adapter/3g6 may be the ideal choice if you've been yearning for true multitasking abilities or want to experiment with tomorrow's microprocessor today. PC



Cheetah's 3½- by 3½-inch board consists of a plug that fits into an 80286 socket; on Intel 80386 microprocessor; and two PALs and five TTL components that control clock synchronization, conversion of 386 signals to 286 signals, and ready signal operations.

PC MAGAZINE FACT FILE

Adapter/386
Cheetah International Inc.
107 Community Blvd., #5
Longview, TX 75602
(800) 243-3724
(214) 757-3001
List Price: $195; 80386 microprocessor, $300 (postpaid).
Requires: 80286-based computer.
In Short: A printed circuit board that adapts 80286-based computers to 80386 compatibility, allowing multitasking without any significant change in performance speed.

CIRCLE 446 ON READER SERVICE CARD

the force that pulls *Metro* together. You can create and edit macros on a screen or record them in learn mode while in your applications program or another *Metro* accessory. Every *1-2-3* user will recognize the syntax and style.

The macro processor includes a delay function so that you can wait for programs to load or for communications links to be established before issuing the next set of keystrokes. Best, it has a rudimentary but powerful programming capability, with variables, gotos, gosubs, conditional testing, text output, and keyboard input. With it, you can create arbitrarily complex macros that perform whole sets of tasks with *Metro* accessories and DOS programs.

> The *Metro* keyboard macro processor is, in a word, excellent.

This programmability is what distinguishes *Metro* from other TSR utilities. Insiders say that writing *Metro* accessories is a snap, so there should be a ready supply of future utilities.

Metro itself will be changing in the near future. It will gain memory management (the ability to swap accessories in and out of memory), maximizing its efficiency while minimizing its size.

The program is also the foundation upon which *Express*, Lotus's TSR MCI Mail manager, is based. I've been using the beta version of *Express* for a few months and it proves the robustness of the *Metro* environment. It's going to be a bright and busy future. PC

PC MAGAZINE FACT FILE

Metro
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
(800) 882-4432
List Price: $85
Requires: 80K RAM, two disk drives, DOS 2.0 or later.
In Short: A memory manager with a smorgasbord of accessories, including a notepad and calculator. Not copy protected.

CIRCLE 447 ON READER SERVICE CARD

Panasonic 9-Pin Printers Are a Dot Matrix Bargain

PC HANDS ON

BY JONATHAN MATZKIN

The reality, until recently, has been simple: a dot matrix printer that produces truly high-quality output will leave a smoking hole where your wallet used to be. And it will probably claim any undeveloped real estate left on your desk. But if two new 9-pin models from Panasonic Industrial Co. are any indication, you need no longer be paralyzed with fear at the thought of buying a printer.

The Panasonic KX-P1080i, at $329, and the KX-P1091i, at $429, are housed in very compact Epson-like boxes, with top-mounted switches for font selection, on/off line, paper advance, and friction or tractor feed.

Setup is straightforward, except for installation of the two-piece paper guide; confusing instructions and inadequate manual diagrams are no help.

But print quality makes these Panasonics outstanding for the price. The KX-P1080i's near-letter-quality characters are darker and smoother than one would expect from a $329 dot matrix printer. It also has draft and italic fonts and compressed print. Emphasis and double-print modes darken output.

The KX-P1091i offers two NLQ fonts. The Courier NLQ typeface is attractive, but the Bold PS font really stands out. The characters are quite dark and, again, are far better than the price would suggest.

Both printers are text and graphics compatible with the Epson MX-80 and the IBM Proprinter. They feature 10-, 12-, 15-, and 17-character-per-inch pitches and proportional spacing. NLQ print is available in all pitches.

The KX-P1080i prints at 82 characters per second in draft mode and 23 cps in NLQ mode. At 81 decibels, it's noisy as dot matrix printers go. The KX-P1091i is a bit quieter (75 decibels) and a bit faster (93 cps in draft mode and 26 cps in Courier NLQ mode).

The KX-P1080i and the KX-P1091i offer solid construction and a pleasing array of features. Neither is a high-end performer, but their outstanding print quality and versatile NLQ abilities make them an excellent value.

List Price: Panasonic KX-P1080i, $329; KX-P1091i, $429. Panasonic Industrial Co., 1 Panasonic Way, Secaucus, NJ 07094; (201) 348-7000.

CIRCLE **426** ON READER SERVICE CARD

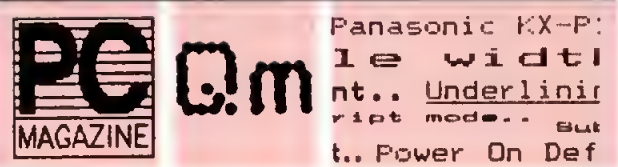
Panasonic KX-P1091i



Type: Dot matrix
Carriage width: 10 in.
Price: $429
SPEED (cps):
Rated: 160
Default: 93
Type pitches (cpi): 10, 12, 15, 17
SOUND LEVEL (decibels):
Rated: 60
Tested: 75

FEATURES:
Printing: Horizontal emphasis (bold), vertical emphasis (double strike), correspondence quality, underline, sub/superscript
Formatting: Proportional spacing, justified lines, centered lines, variable form length, horizontal tabs, vertical tabs
COMPATIBILITY:
IBM character set: Low and high
Graphics: Epson MX-80, IBM Proprinter
Text: Epson MX-80, IBM Proprinter

Panasonic KX-P1080i



Type: Impact matrix (9 Pins)
Carriage width: 10 in.
Price: $329
SPEED (cps):
Rated: 120
Default: 82
Type pitches (cpi): 10, 12, 15, 17
SOUND LEVEL (decibels):
Rated: 63
Tested: 81

FEATURES:
Printing: Horizontal emphasis (bold), vertical emphasis (double strike), correspondence quality, underline, sub/superscript
Formatting: Proportional spacing, justified lines, centered lines, variable form length, horizontal tabs, vertical tabs
COMPATIBILITY:
IBM character set: Low
Graphics: Epson MX-80, IBM Proprinter
Text: Epson MX-80, IBM Proprinter

Olympia's $649 NP136: A Competent Performer

PC HANDS ON

BY JONATHAN MATZKIN AND PHIL ROSE

The dependable family car will not speed up your pulse rate the way a Ferrari does, but it does get you from point *a* to point *b* in solid, unspectacular style. The Olympia NP136 dot matrix printer, like the dull sedan, does what it is supposed to without calling attention to itself—which is exactly what most people hope a printer will do.

It is a steady, fast performer with a number of convenient features. Its draft-mode print speed of 157 characters per second gets the job done quickly, and a decent near-letter-quality mode prints documents at a rather speedy 49 cps. The sound level is about average, at 77 decibels.

But like the family sedan, the

(continues on page 38)

Olympia NP136



Type: Impact matrix (9-pins)
Carriage width: 16⅞ in.
Price: Parallel interface, $649, serial interface, $699
SPEED (cps):
Rated: 200
Default: 157
Type pitches (cpi): 10, 12, 17.1, 5, 8.6
SOUND LEVEL (decibels):
Rated: 58
Tested: 77

FEATURES:
Printing: Horizontal emphasis (bold) vertical emphasis (double strike), underline, sub/superscript
Formatting: Proportional spacing, variable line heights, variable form length, horizontal tabs, vertical tabs
COMPATIBILITY:
IBM character set: Low and high
Graphics: Epson FX, IBM Proprinter
Text: Epson FX, IBM Proprinter

You're losing it.

You lose important information every day because your computer can't handle it.

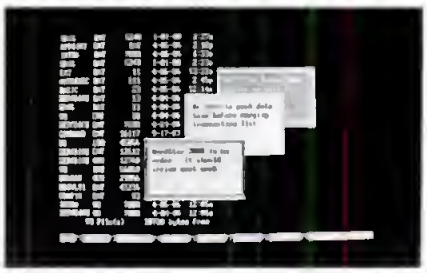
Computers know how to deal with routine information. But when something unexpected comes along, it doesn't always fit. Your software can't handle exceptions, assumptions, additions or attachments, so important information gets lost.

It's a big problem. That's why we invented SmartNotes.™ *SmartNotes gives you a place for everything.* Now you can put notes anywhere on your screen to capture information that your software is not structured to accept.

With SmartNotes, you can *attach* a note to any piece of information that appears on your screen. Whenever the relevant information reappears, the note pops up. You might attach a note to a phrase or passage in your word processor, to a cell location in your spreadsheet, or to a field or record in your database. It's easy. Notes pop up for reading but you can hide them to reveal what's underneath.

Life becomes more meaningful.

Think about how SmartNotes can add new meaning to DOS file directories. What the heck is NEWCASH2.WK1? Attach a note and you'll never be confused. Whenever the filename appears on the screen, in any directory, its descriptive note is right alongside.



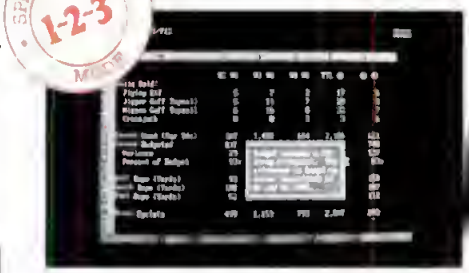
And SmartNotes is great for database work. Now you can record two phone numbers when your PHONE field expects only one. Or you can keep track of conversations with slow-paying customers – note every promise and excuse right on the screen on top of the customer's record. Or use SmartNotes to record shipping and billing irregularities – "Customer asked for two copies of invoice and tax waiver form." SmartNotes can make your database a little bit smarter.

Stick it to Lotus.

Your spreadsheet is a terrific tool to help you ask, "what if?" But it's not very helpful when you come back later and ask, "what's that?" "What's that tax assumption in ROW 23?" "What's that formula in D9?" With SmartNotes, you can document your work. Attach notes to rows, columns and cells. Keep track of every critical assumption!

And with SmartNotes, you can attach notes to 1-2-3 filenames so you can remember what's in every file. Now you don't have to load a worksheet to learn what it's all about.

If you're a 1-2-3 power user, you'll appreciate SmartNotes' ability to annotate macro programs. And the ability to attach notes to 1-2-3 database fields...notes that STAY attached when you sort or query. *SmartNotes is simply the best and most flexible tool for 1-2-3 spreadsheet documentation.*



Like electronic Post-it Notes.

SmartNotes gives you an inexhaustible supply of bright little notes with special electronic glue on their back – stick them to any document in your word processor. *There is no better way to manage the creation and revision of large documents.* SmartNotes can be your editorial assistant. "Be sure to verify sales figure." "Delete the reference to Mr. Hedly's mother-in-law." "Check with legal about trademark."

SmartNotes runs on any IBM PC, XT, AT or compatible. It's the perfect companion for 1-2-3, dBASE, WordStar, Word Perfect, Sidekick and most popular software. Just $79.95. Not copy protected.

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Bill Machrone, PC Magazine

"A remarkable and enormously useful program. We've added it to our short list of indispensable utilities."
Review Board, InfoWorld

"Someday you'll own SmartNotes. It's one of those utilities that, like The Norton Utilities, Prokey or Sidekick, finds its way onto seriously used personal computers."
Richard Aurora, PC Magazine

"If you are a 3M Post-it Notes addict then you will constantly use this electronic equivalent."
Robin Raskin, Download - IRD

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Michael Antonoff, Personal Computing

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CIRCLE 282 ON READER SERVICE CARD

■ COMMUNIQUES ■ EDITED BY BILL HOWARD

So That's Why They Call It a Motherboard

From the instructions for installing a Systems Manufacturing Technology XT-No-Slot-Clock:

"4. Look at the motherboard of your computer. On most XT style computers you will find a series of 28 pin EPROM sockets lactated somewhere near the 8 expansion slots. Locate an empty socket. If you found an empty socket skip to step x."



- Range up to 2 inches
- Up to 19.2 Kbps

Advertisement for RAD Data Communications' fiber-optic modem. An emerging technology, no doubt.

From Webster's Unabridged

Hardware: Product that, if you play with it long enough, breaks.

Software: If you play with it long enough, it works.

Classified Intelligence

TRS-80 Model II & Hard Disc, 1 Sloppy Drive. $450/or best ofr. EVES., 433-xxxx or 433-xxxx.

—*Classified ad*, The Deerfield *(Ill.)* Review

IBM/XT compatible, 150 watt power supply, 256K, mono monitor, graphics card, sloppy disk drive, keyboard, $699.

Modem Special: 1200 Baud Internal, $125. Computer Resale Center 523-xxxx.

—*Classified ad*, The Kansas City Times, *December 14, 1986*

COMPUTER printer: NEC Spinwriter 2010, letter quality, 20 characters per second, cereal interface. New it lists for $995. Used $375. Call Roger 888-xxxx.

—*Classified ad*, Winchester *(Va.)* Star

Word Processor, accurate, preferably on Multimate or R-Base. N. Etobicoke. Call Mrs. Darmanin 743-xxxx.

—*Help wanted ad*, Toronto Star

At Least the Mouse Is Free

Microsoft's new Mach 10 turbo board doubles the processing time of your PC or compatible. Includes Microsoft Mouse and *Micrasaft Windaws*. Regularly $549.

—*Newspaper display advertisement for Micrasoft's new Mach 10 accelerator card at CamputerCraft, San Antonio, Texas. (The stare slagan is: "For all the right reasons.")*

Thanks, We'll Stick with DOS

"It's true that [UNIX] commands are cryptic, but that doesn't make the system not user friendly, it just makes it hard to learn. Once learned, the system is quite easy to learn."

—*Jan Lewis's* Computer Insider *newsletter*

Revised History

"The secret to Harvard dropout William Gates' millions is BASIC—the computer language he invented."

—*From "Secrets of America's Youngest Millionaires,"* STAR *magazine, November 11, 1986*

Heard or seen unything offbeat, unusual, or just plain dumb about the computer industry? Send your offerings (but please, no mare "Lotus I, II & III" want ads) to Communiqués, PC Magazine, One Park Avenue, New York, NY 10016; (212) 503-5293 or MCI Mail 157-9301. If you send a clipping, please identify the newspaper or magazine.

Contributors receive $50 and a PC Magazine T-shirt. Contributors this issue: Jim Seymour (UNIX), Bob Locher and Bill Kuefel (sloppy drives), Tony Niilus (XT clock), Mark Mondil (fiber optic modem), Randy Montgomery (Mach 10 board), Brenda Hunt (Bill Gates), Sol Libes (hardware/software definitions), Emerson Hawley (cereal printer) and Russell Whyte (help wanted).

Olympia NP136

(continued from page 36)

NP136 is sometimes clumsy and difficult to maneuver. The control panel is a flat membrane, and while individual buttons are clearly marked status lights are the only indication that you get of whether a button has been effectively pushed.

The lack of a top-of-form button is an annoying omission. Turning the power off and then on is the only way to set a sheet at top-of-form, and this results in the disturbing loss of any switch settings you may have previously entered.

Also, the OFFLINE-FF-ON-LINE sequence cannot be entered as a set, so you must wait for the paper to finish feeding before the NP136 can be brought back on-line.

The Olympia NP136 is a competent, sturdy combination of speed and useful features. The one thing it doesn't offer, though, is a compelling reason to choose it instead of one of the many other quality printers in its class.

List Price: Olympia NP136, $649 with parallel interface; $699 with serial interface. Olympia USA Inc., P.O. Box 22, Somerville, NJ 08876; (201) 722-7000.

CIRCLE **427** ON READER SERVICE CARD

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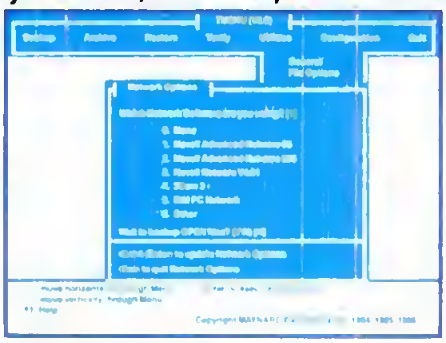
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IN

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The MaynStream makes customized backup a reality, giving you unprecedented control over one of your computer's most important functions. Options include **Networking,** which is designed to work with all popular LANs including Novell, 3COM, and IBM's PCNet.* The MaynStream will not only back up a network while the network is up and running, but will actually back up open files automatically once they're closed! *No other system currently on the market can do this!* The MaynStream's other features include **Automatic Save; File & Directory Marking** for backing up select files, directories, and subdirectories; **Archive; Verify;** and **Backup Macros** for unprecedented convenience.

CIRCLE 478 ON READER SERVICE CARD

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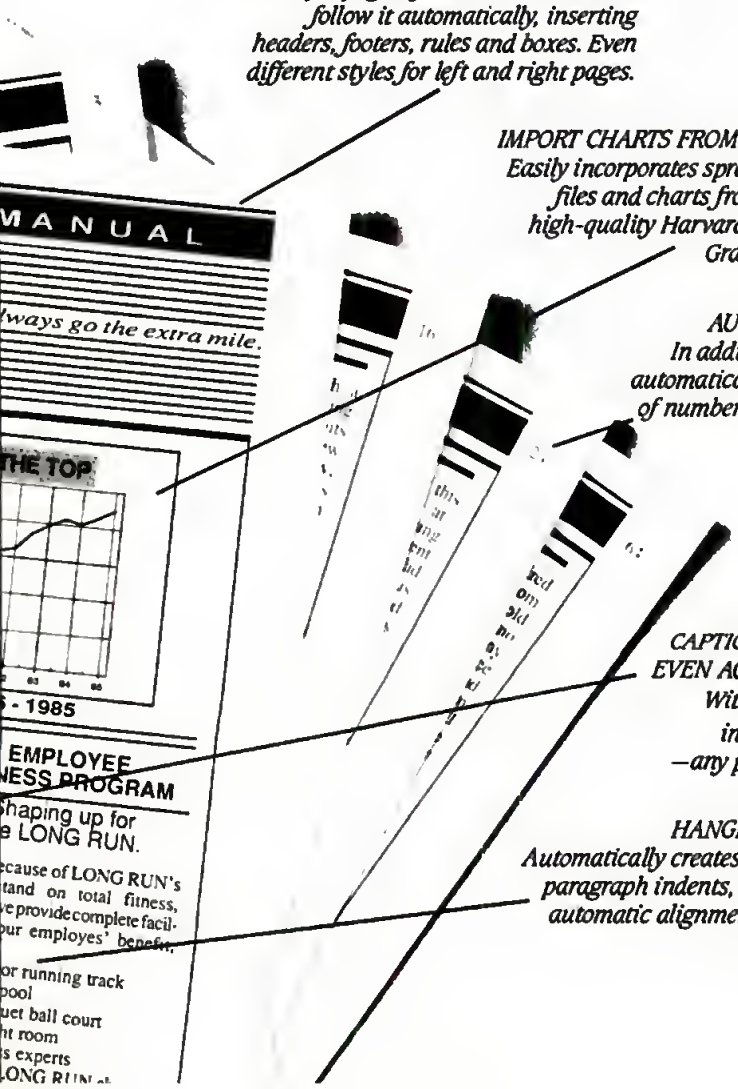
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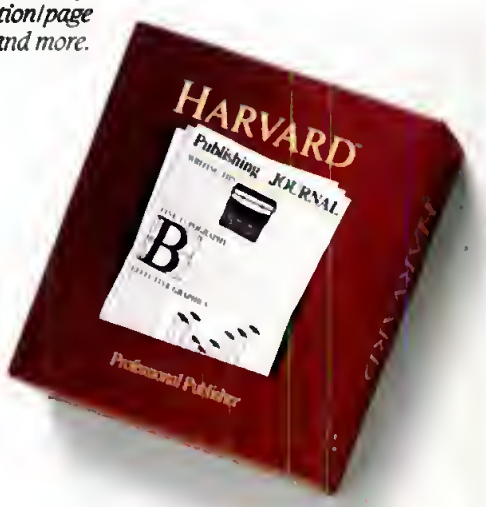
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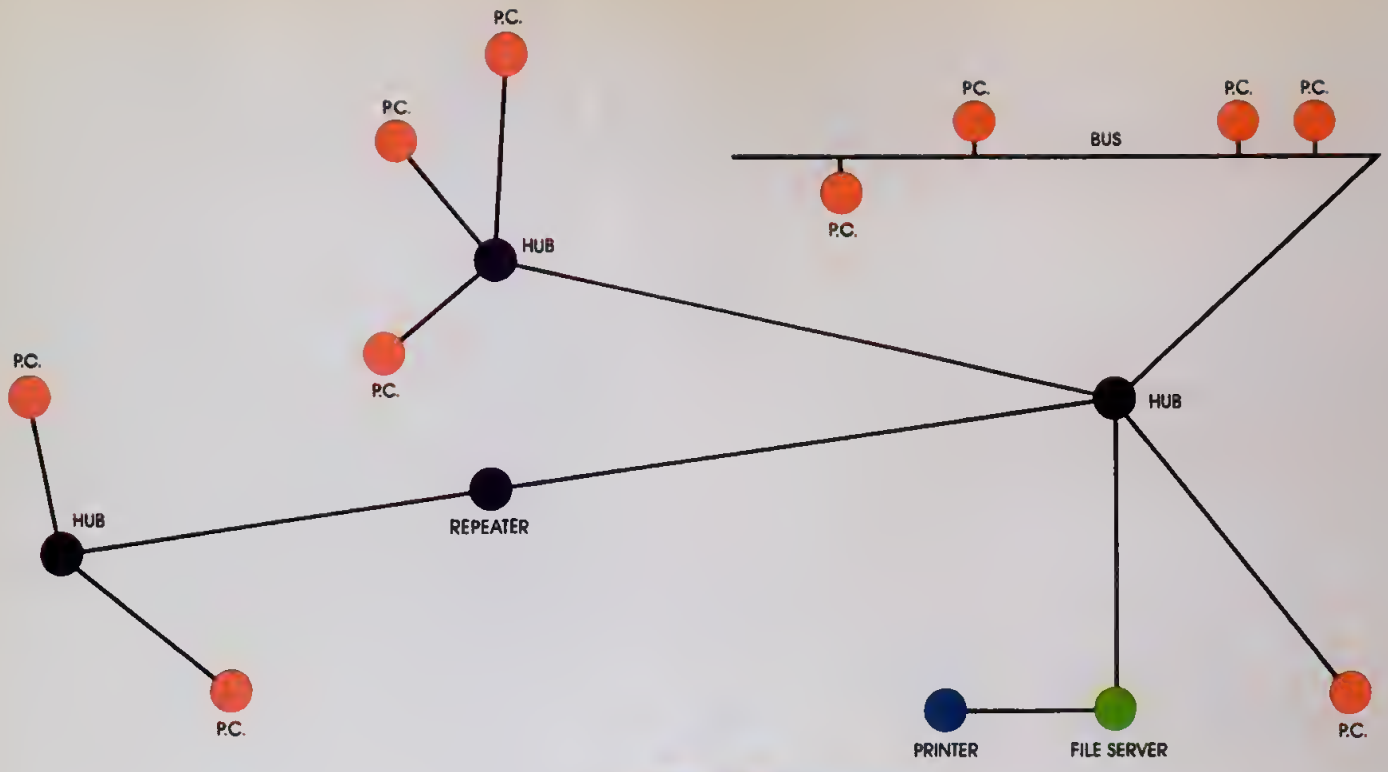


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CIRCLE 129 ON READER SERVICE CARD

ComcoModem 2400PC: Best bps/ Dollar Ratio in a 2,400-bps Modem

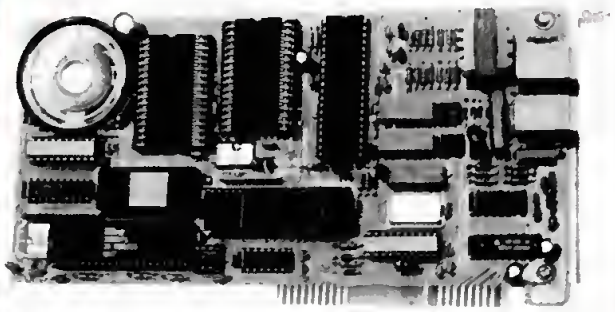
PC HANDS ON

BY M. DAVID STONE

If you've been thirsting after a 2,400-bit-per-second modem but have been put off by the high cost, Multitech Electronics' ComcoModem 2400PC may be the product you've been waiting for. Priced at $289 and bundled with the *BitCom* communications program, ComcoModem offers most of the features of the Hayes Smartmodem 2400 at less than half the price.

The ComcoModem is a half-card, internal modem. Installation is almost trivial: set the only jumper for the proper COM port, plug in the modem, and plug in the phone line. As with the Smartmodem 2400, the ComcoModem eliminates DIP switches, opting instead for storing its settings in an on-board, nonvolatile memory.

Communications novices will appreciate the clear writing and simple diagrams in the user guide. The more experienced user will appreciate the detailed table of contents that makes it easy to find information.



Familiar circuits do the work on the ComcoModem 2400PC: top center, a set of three Rockwell modem chips and, bottom left, a Zilog Z8 processor.

The ComcoModem is compatible with both the Bell (U.S.) protocols and CCITT (European) protocols. Specifically, the modem is Bell 103 compatible at 0 to 300 bps, CCITT V.22 compatible at 600 bps, Bell 212 compatible at 1,200 bps, and V.22 compatible at 1,200 bps. At 2,400 bps, the modem uses the worldwide V.22-bis standard. As with the Smartmodem 2400, the ComcoModem includes an AT command for selecting between the Bell 212 protocol and the V.22 protocol at 1,200 bps.

The ComcoModem lacks synchronous communications capability but is otherwise functionally equivalent to the Hayes Smartmodem 2400. It obeys virtually the entire Hayes extended command set.

On PC Labs compatibility tests, the ComcoModem performed without a hitch, working both with *Relay Gold* (installed for a Smartmodem 2400) and with *Smartcom II*.

Even more noteworthy are the results of PC Labs modem performance tests. At 1,200 bps, the ComcoModem was comparable to the Hayes Smartmodem 2400, but at 2,400 bps, the ComcoModem was clearly superior. On a worst-case line, the ComcoModem reliably transferred information with a significantly lower signal-to-noise ratio than the Hayes Smartmodem needed.

If you're interested in 2,400-bps asynchronous communications, the combination of low price, high performance, and Hayes compatibility makes the ComcoModem hard to beat. PC

PC MAGAZINE FACT FILE

ComcoModem 2400PC
Multitech Electronics Inc.
401 Charcot Ave.
San Jose, CA 95131
(408) 922-0333
List Price: $289
In Short: The ComcoModem offers 2,400-bit-per-second asynchronous communications with low price, high performance, and a high degree of Hayes compatibility.

CIRCLE 421 ON READER SERVICE CARD

turboMagic Manages the Interface For Turbo Pascal Applications

PC HANDS ON

BY NEIL J. RUBENKING

turboMagic is its own best advertisement—all the input screens, menus, and help screens were created using *turboMagic* itself. It generates code for Turbo Pascal applications, providing pull-down menus, vertical moving-bar menus, help screens that can scroll up and down within a window, and a wide variety of data types with automatic validation.

Besides the expected handling of screens and data entry, *turboMagic* offers some rather unusual features. You can create scrolling input forms that are longer than the display screen, up to 66 lines. Define a help window for some or all of the fields, and the F1 key will give you context-sensitive help.

The fields themselves can take on a wide variety of automatically validated data types, including the "menu" type, which flips through a set of predefined options at the press of a key. If you don't find the data type you need, you can create a new type and define valid input for it. Fast automatic updating of dependent fields adds flair to your input screens.

When you've finished with the handy screen editor, *turboMagic* generates the necessary source code. Be warned, it's a lot of code. This is only reasonable, though, since it does a lot of work. If your application itself requires a lot of code, you may exceed Turbo Pascal's 64K-byte code-segment limit. The *turboMagic* manual includes some hints on using Turbo's overlay facility to get around this problem.

A bonus program creates an Install program to set up your application for use with a number of different video and printer types. You may freely distribute the object code of this Install program and your application without royalties, but you may not distribute any of the source code files.

PC MAGAZINE FACT FILE

turboMagic
Sophisticated Software
6586 Old Shell Rd.
Mobile, AL 36608
(800) 225-3165
List Price: $99
Requires: 256K RAM; Turbo Pascal, Version 3.*x*; 80-column mono or color display; two disk drives; DOS 2.0 or later.
In Short: A code generator for Turbo Pascal with some unusual features. It handles user input, menus, and help very thoroughly. Not copy protected.

CIRCLE 425 ON READER SERVICE CARD

turboMagic will be a blessing for programmers who would rather not write the user interface for every program. PC

■ NEW ON THE MARKET ■ JONATHAN MATZKIN



Ricoh's PC Laser 6000, at $2,395, prints at 6 pages-per-minute, and weighs only 34 pounds.

Two Laser Printers At Opposite Ends of The Price Spectrum

Laser printers continue to evolve as desktop publishing makes the transition from hype to reality. New printers are appearing at both ends of an increasingly wide price range.

Already established as a maker of laser engines for other manufacturers, **Ricoh Corp.** has just introduced its second complete printer, the $2,395 PC Laser 6000, a six-page-per-minute printer based on Ricoh's newest second-generation engine, the Model 1060. The 300-dot-per-inch printer comes with a controller configured with 1 megabyte of RAM, expandable to 2 megabytes. The controller has its own graphics command set, which includes Diablo 630 emulation, and optional emulation cards are available for the HP Laserjet Plus, the IBM Proprinter, and the Epson FX-80.

Ricoh says the PC Laser 6000 prints to a fully bit-mapped 8½- by 14-inch page. It supports up to 32 fonts per page from among eight resident fonts, font cartridges, or fonts downloaded from a host microcomputer.

The $11,990 Talaris 1500 from **Talaris Systems** is based on Ricoh's LP4150 engine. The printer has a very fast print speed of 15 ppm, sustained by a dual-page print buffer.

The 1500's controller formats a half-letter size, letter size, legal, or A4 page at 300-dpi resolution. The board uses the QUIC programming language and is equipped with 3.5 megabytes of RAM and a Motorola 68000 processor. Twenty-one fonts are standard in ROM, and up to 60 additional fonts can be installed in the controller. Talaris offers more than 1,000 fonts in down-line-loadable format.

List Price: PC Laser 6000, with 1 Mbyte RAM and parallel and serial interfaces, $2,395. Ricoh Corp., 5 Dedrick Pl., West Caldwell, NJ 07006; (201) 882-2000.

CIRCLE **440** ON READER SERVICE CARD

List Price: Talaris t500, with 3.5 Mbytes of RAM, $11,990. Talaris Systems Inc., 5160 Carroll Canyon Rd., P.O. Box 261580, San Diego, CA 92126; (619) 587-0787.

CIRCLE **441** ON READER SERVICE CARD

Sharp PC-7100 Portable Has a Hard Disk, "Supertwist" Crystal Display

Sharp Electronics Corp.'s PC-7100, at $2,795, puts desktop power into a box of a size somewhere between a Compaq portable and a laptop PC. The 8.5- by 16.1- by 6.3-inch system has a single 5¼-inch disk drive and a 49-millisecond, 20-megabyte hard disk. It weighs in at a pleasingly plump 20.6 pounds with its full-size AT-style keyboard snapped in place for transportation.

The PC-7100 comes with 320K bytes of RAM, expandable on the motherboard to 704K, and a blue-on-white, 25-line by 80-character supertwist illuminated liquid crystal display. It operates an 80C86-2 microprocessor at either 7.37 or 4.77 MHz.

Sharp has also debuted a functionally equivalent lower-priced version, the $1,795 PC-7000A, which substitutes a second 5¼-inch floppy disk drive for the hard disk.

Sharp's $2,795 PC-7100 offers a 20-Mbyte hard disk and optional color graphics in a truly portable, if not feather-light, package.

List Price: PC-7100, with 320K RAM, 20-Mbyte hard disk, and supertwist LCD, $2,795; 128K RAM kit, $79; GW-BASIC, $65; internal modem, $255. PC-7000A, with 320K RAM, twin 5¼-inch disk drives, supertwist LCD, $1,795. Sharp Electronics Corp., Sharp Plaza, Mahwah, NJ 07430; (201) 529-9500.

CIRCLE **432** ON READER SERVICE CARD



HOT PROSPECT

Word Processor Creates, Edits, Enhances Documents Inside 1-2-3

Turner Hall Publishing's $99.95 *4Word*, a "hot key"–activated *1-2-3* add-on, mates a full-function word processor to the industry-standard spreadsheet. *4Word* installs directly into *1-2-3* and is accessed without leaving the host program.

A one-way "hot link" copies cells from *1-2-3* spreadsheets into *4Word* documents, which are automatically updated to reflect any changes to cell entries. And *4Word* places standard word processing features—like word wrap, move, copy, and search and replace—at the fingertips of *1-2-3* users. Text-enhancement features include boldfacing, underlining, and italicizing characters.

The *4Word* interface features familiar *1-2-3*–style command menus and shares *1-2-3* commands, such as Print and File. Moving around inside a document is similar to navigating within a spreadsheet. You can build macros in *1-2-3* to use with *4Word*.

Since *4Word* becomes a part of *1-2-3* by attaching itself to the program's drivers, Turner Hall says there is no conflict with memory-resident software like Borland International's *SideKick*. *4Word* is the first program to take advantage of newly released Lotus specifications that will aid programmers in writing applications that work within *1-2-3*.

List Price: *4Word*, $99.95. **Requires:** 45K RAM; *1-2-3*, Release 2 or later. Not copy protected. Turner Hall Publishing, 10201 Torre Ave., Cupertino, CA 95014; (408) 253-9607.

CIRCLE **431** ON READER SERVICE CARD

High-Speed Disks Provide Mass Storage For the Deskpro 386

National Memory Systems Corp. has released a series of hard disk subsystems as large as 689 megabytes for the Compaq Deskpro 386. The $10,500 C-8003 system has a 374-megabyte capacity, the $12,900 C-8005 holds 510 megabytes, and the top-of-the-line C-8006, which costs $14,900, holds a whopping 689 megabytes.

The C-8000 series transfers data at up to 2.45 megabytes per second, and average access is as fast as 15 milliseconds, according to National Memory Systems. The disk drives are provided with NMS 8000 or 8600 series controllers and interface with the Deskpro through any 8- or 16-bit slot. The 8600 controller can support up to four drives simultaneously.

DOS users can select disk

Five Hayes-Compatible Modems Offer Assortment of Features and Prices

If anything like a true standard exists in the PC universe, Hayes compatibility is it. This winter has seen a blizzard of Hayes-compatible modems fall onto the market, with a range of features, capabilities, and prices.

Prentice Corp. has introduced the P-2424, a 2,400-bit-per-second, intelligent external modem designed for interoffice and long-distance communications networks. The P-2424 features the Prentice open-architecture interface connector, which accepts multifunction add-on boards.

A voice/data switch allows switching between data and voice during the same phone call. The P-2424 supports manual or auto-answer and auto-dial operation and works with both touch-tone and pulse-dial phones. The modem costs $695 as a standalone unit and is also available in a $595 rack-mountable version.

A complete line of Starcom intelligent modems is available from **Scoa Systems** in both internal and external models. All models feature full or half duplex, auto-dial and auto-answer, last-number redial, touch-tone and rotary-dial pulse dialing, built-in volume-controlled speakers, 40-character command buffer, and a 8039 microprocessor.

The $599 Starcom 2400 SE external modem operates at a maximum data transmission rate of 2,400 bps and features eight LED status indicators. The $579 Starcom 2400 SB internal modem fits into a standard full-length expansion slot.

Franklin Telecom's $460 FM-2400E is a 2,400-bps external modem that incorporates custom LSI circuits in its small, low-profile package. The company has also introduced the Bright modem, a full-function, $149 unit on a 5-inch half-card that fits into the short slot of the IBM PC Convertible. The modem operates at 1,200 and 300 bps and features dual jack inputs and switch-selectable settings for COM1 or COM2 ports.

The Evercom-24, a half-card internal modem from **Everex Systems**, has a list price of $289. Among its numerous automatic features, the modem has automatic data-to-voice switching.

During transmission, you simply lift the phone receiver to switch to talk mode.

The Intellimodem, $599 from **Bizcomp Corp.**, features adaptive echo-canceling technology intended to improve the modem's bit error rate. Software burned into the firmware and echo-canceling circuits on the modem board cancel most locally generated phone-line echo.

The Prentice P-2424 external modem, which lists for $695, can be interchanged between stand-alone and rack enclosures.



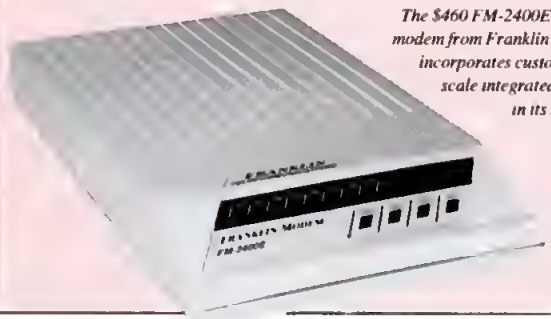
List Price: P-2424, as a standalone unit, $695; rack-mount version, $595. **Requires:** Serial port, communications software, RS-232 cable. Prentice Corp., 266 Caspian Dr., P.O. Box 3544, Sunnyvale, CA 94088; (408) 734-9810.

CIRCLE **433** ON READER SERVICE CARD

List Price: Starcom 2400 SE, $599; Starcom 2400 SB, $579. **Requires:** Starcom 2400 SE: serial port, communications software, RS-232 cable. Starcom 2400 SB: communications software. Scoa Systems, 2100 Golf Rd., #100, Rolling Meadows, IL 60008; (312) 640-8798.

CIRCLE **434** ON READER SERVICE CARD

The $460 FM-2400E external modem from Franklin Telecom incorporates custom large-scale integrated circuits in its slim-line design.



List Price: FM-2400E, $460; Bright modem, $149. **Requires:** Serial port, RS-232 cable. Franklin Telecom, 31320 Via Colinas, #113, Westlake Village, CA 91362; (818) 706-1186.

CIRCLE **435** ON READER SERVICE CARD

List Price: Evercom-24, $289. **Requires:** Serial port, RS-232 cable. Everex Systems Inc., 48431 Milmont Dr., Fremont, CA 94538, (415) 498-1111.

CIRCLE **436** ON READER SERVICE CARD

List Price: Intellimodem 2400, $599. **Requires:** Communications software, serial port, RS-232 cable. Bizcomp Corp., 532 Mercury Dr., Sunnyvale, CA 94086; (408) 733-7800.

CIRCLE **437** ON READER SERVICE CARD

volume sizes of from 32 megabytes up to a single volume partition of 1,024 megabytes.

Similar versions of the C-8000 series disk drives are available for both the PC AT and RT PC.

List Price: C-8003, $10,500; C-8005, $12,900; C-8006, $14,900. National Memory Systems Corp., 355 Earhart Way, Livermore, CA 94550; (415) 443-1669.

CIRCLE **442** ON READER SERVICE CARD

Co-Compute Allows Shared Phone Line Applications Sessions

A multitasking conferencing environment—over a single phone line—can be created with *Co-Compute*, according to **Harmony Technology Associates**. The program's resident conferencing commands let users take turns operating DOS applications while the application runs in synchronization on the other computer. The phone line can be toggled between voice and data.

Users of *Co-Compute* can also conduct a windowed note conversation while an application is running, and a pop-up real-time keystroke display shows all keystrokes as they are used to run an application. The size and location of the note or keystroke display window can be adjusted by each conferee on the screen they are using.

Co-Compute permits either menu-driven or command-driven operation. The pop-up menus are status-sensitive and allow only valid choices.

List Price: *Co-Compute*, $95. **Requires:** 50K RAM for resident portion, Hayes-compatible modem, DOS 2.0 or later. Not copy protected. Harmony Technology Associates, 3700 S. Sepulveda Blvd., #332, West Los Angeles, CA 90034; (213) 398-0878.

CIRCLE **438** ON READER SERVICE CARD

Everex Systems $399 286 Board for PCs Has Room for 640K

Yet another speed-up board has found its way into the do-it-faster market. The $399 Excelerator, from **Everex Systems**, is an 80286-driven board that can be configured with up to 640K bytes of RAM. Everex claims that the Excelerator boosts PC or XT performance to the level of an 8-MHz, zero-wait-state PC AT. Excelerator has a socket for an optional 80287 math coprocessor.

List Price: Excelerator, with 0K RAM, $399. Everex Systems Inc., 48431 Milmont Dr., Fremont, CA 94538; (414) 498-1111.

CIRCLE **443** ON READER SERVICE CARD

Inset Integrates Any Graphics Screen into Another Application

PC HANDS ON

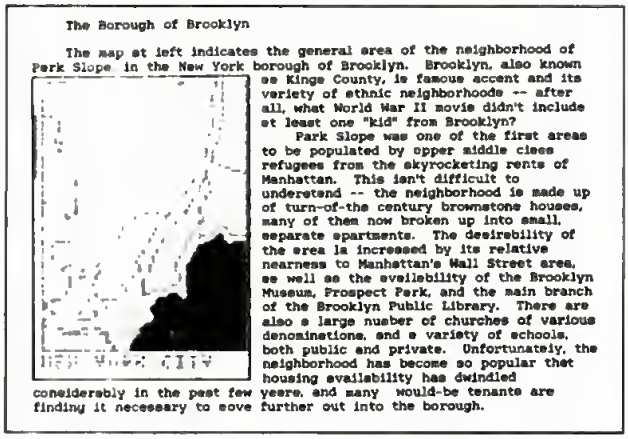
BY BARBARA KRASNOFF

While elaborate desktop publishing programs promise to make your computer into a veritable print shop, American Programmers Guild has introduced a $99 RAM-based utility, called *Inset*, that lets you easily pick up screen images from an application, modify them, and integrate them into hard-copy text using your own word processing software.

Simpler Is Better

Inset operates on the theory that "simpler is better." It uses the Shift-PrtSc key combination (or any other key combination you prefer) to capture the current screen image. When you print out a text file, you place the name of the saved image within brackets, and *Inset* will insert the graphic in the appropriate place. The program works with a variety of dot matrix and laser printers and will toggle the printer between text and graphic modes as necessary.

An assortment of features enhances the program's considerable usefulness. There is an efficient graphics editor that can modify the image in a number of ways, such as altering size and shape, "clipping" parts, or even creating simple designs. In order to orient your graphic properly, you can also bring *Inset* up while you are editing your text. *Inset* automatically indicates the borders of the graphic on-screen; at this point, you have the option of modifying the image or your text as needs dictate.



Images captured with Inset *can be scaled, altered, and merged with other elements. Above, text created with a word processor was wrapped around a map that was downloaded from CompuServe with LCS/Telegraphics'* Television.

PC MAGAZINE FACT FILE

***Inset*, Version 2.0**
American Programmers Guild Ltd.
12 Mill Plain Rd.
Danbury, CT 06811
(203) 794-0396
List Price: $99
Requires: 110K RAM without the graphics editor (125K RAM with the editor), two floppy disk drives, graphics printer, DOS 2.0 or later.
In Short: *Inset* grabs on-screen images and places them, with any necessary modifications, within text files. It produces highly professional-looking hard-copy text/graphic combinations. Not copy protected.

CIRCLE 422 ON READER SERVICE CARD

Inset could be the beginning of a new trend. Instead of trying to act as a combination word processor and graphics program, it instead accepts and integrates independently created text and graphics—with highly professional results. It would make a worthwhile addition to any software library.

Squish Puts a Squeeze on Files Before They Are Written to Disk

PC HANDS ON

BY STEPHEN RANDY DAVIS

When is a 20-megabyte hard disk not a 20-megabyte hard disk? When the RAM-resident file-compression utility *Squish* from SunDog Software Corp. is installed.

The good news is that *Squish* loads into RAM and automatically squeezes files as they are written to disk and unsqueezes them when they are read—all completely transparent to applications software. A 19,215-byte text file generates a 12,800-byte squeezed file, a reduction of 33 percent. Files that have lots of repetitive characters, such as spreadsheets and databases, can shrink by as much as 90 percent.

The bad news is the increased time and clutter *Squish* entails. Even though the squeeze/unsqueeze process is invisible to both the applications software and the user, the squeezed file above needed 5 extra seconds to access on a standard PC because of the unsqueeze process. On an 8-MHz AT, this delay was practically unnoticeable. Another problem, *Squish* creates *Squish* translation files as a part of the squeezing process. These files have to be retained, and they appear in the directory as extraneous clutter files.

User Interface

Squish's user interface needs a little work on the details. For example, since there is no directory command, you must exit and reenter *Squish* if you forget the spelling of the file to be squeezed. More important, *Squish* was just too *present*. I had hoped *Squish* would just quietly perform its magic, expanding my little disk without me even being aware of its presence. Instead, each directory and most files must be individually installed in *Squish*. A more automatic *Squish* would be greatly appreciated.

Still, *Squish* is ideal for those with more files than disk space and especially with large data files with large amounts of repetition.

PC MAGAZINE FACT FILE

Squish
SunDog Software Corp.
264 Court St.
Brooklyn, NY 11231
(718) 855-9141
List Price: $79
Requires: DOS 2.0 or later.
In Short: A RAM-resident utility that compresses data files, from 33 to 90 percent, before they are stored. Not copy protected.

CIRCLE 423 ON READER SERVICE CARD

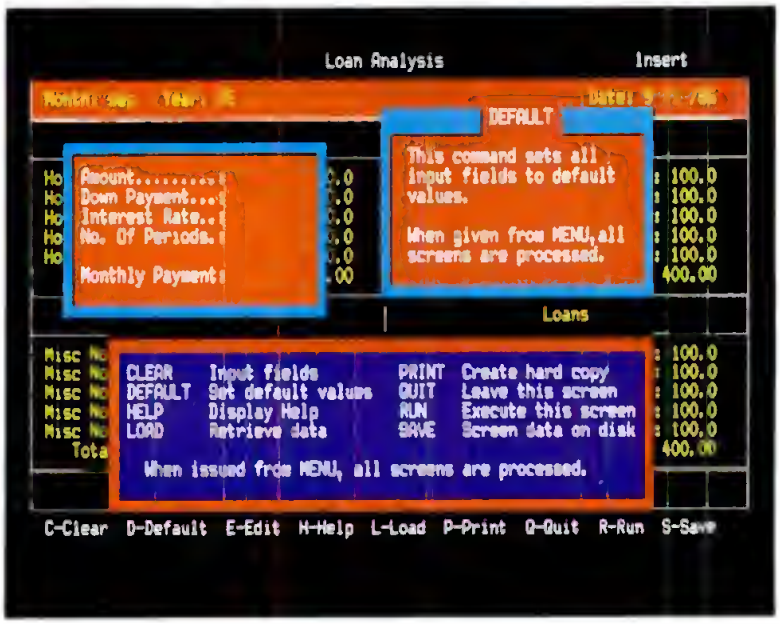
Pascal Helper™

PASCAL PROGRAMMERS HAVE BEEN TAKING HOURS, DAYS OR MAYBE EVEN WEEKS TO WRITE GOOD PROFESSIONAL QUALITY USER FRIENDLY PROGRAMS

But with Pascel Helper, you cen reduce this time to minutes end concentrate more on your application itself. The created programs have all the feetures you always wanted and more. These are features on which you had to compromise due to lack of time or whetever may be your reasons. With Pascel Helper, all you ever have to do is draw the screens end enter variebles. Pascel Helper then creetes the complete program environment ready for compiling and your finished program can look thie good. . .

CREATED PROGRAM FEATURES

- Variables may be Real, Integer or String and can be arrays.
- Powerful but user friendly word processor style editor.
- Windows and layered screens.
- Indexed Help Facility.
- Formatted Outputs for printing.
- Menue with sub-levels that provide access to Command Processor.
- Command Processor for one or all screens. Clear, Load, Help, Print Run, Default end Save.
- Extensive Error Checking. Help facility access on error.
- Set data to default values or check for validity between ranges.
- Unlimited Screens for applications or Help Facility.



The created programs are flexible, simple and eesy to understand and you do not even need a test program to compile and run. If your application procedure is not ready, you cen use a dummy procedure for compiling. This allows incremental development of your module and saves more time during debugging end testing.

TURBO PASCAL IBM PASCAL MICROSOFT PASCAL
LINK MS-FORTRAN SUBROUTINES
WITH CREATED MS-PASCAL CODE
• Technical Support • Not Copy Protected
Requires 128k IBM PC/XT/AT or compatible, DOS 2.1 or later and any display.

Pascal Helper comes complete with a 121 member fully documented library with source code on disk. It adds only 21K for all features or 13K for limited features for Turbo Pascal. You can use these procedures from your modules for displaying screens or accessing fields or for such advanced features:

- MEMORY MANAGEMENT that gives you control on number of screens that stay resident in memory. No more annoying disk access times shifting screens.
- DISPLAY SCREENS AS WINDOWS. On exit, the base screen is instantly restored. Screens can also be displayed as layers. Pascal Helper Window Screens are dynamic and can be displayed anywhere and as many times as you wish on the same screen. Field data on Screens or Windows remains intact for subsequent reaccess.
- SPLIT SCREENS for multiple applications. Interactive and restricted editing of one or more fields on any screen or window from your module.
- CREATE SCREENS within your program and process them. All you need to do is define the screen fields. Use the library procedures with screens not even created using Pascal Helper for editing, command processing, reading special keys, error messages and more.

Pascal Helper $79.95*

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CIRCLE 171 ON READER SERVICE CARD

QUICK LOOKS

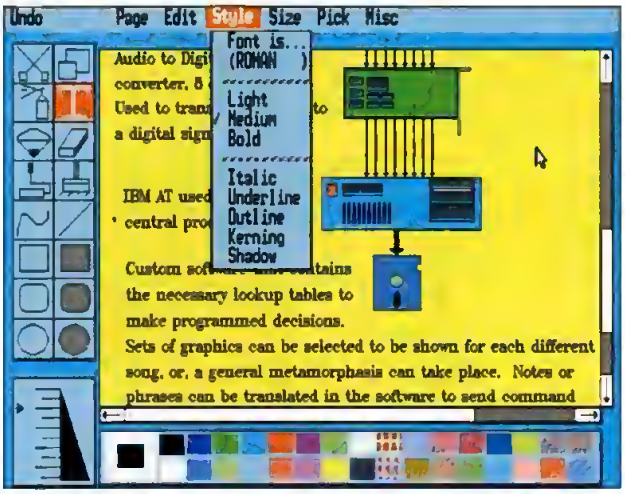
PC Paintbrush Expands Drawing Area

PC HANDS ON

BY GERARD KUNKEL

PC Paintbrush from Z-Soft Corp., the most ubiquitous DOS paint program, is back with a plus version. On the surface nothing has changed. The same EGA capabilities are present: 16 colors, 640 by 350 screen resolution, hardcopy output and image capture through Z-Soft's Frieze utility, and so on. Underneath, however, *PC Paintbrush Plus* has been restructured to accept a full-page scanned image into a virtual page.

For those who desire a larger painting surface, there is a lot to be happy about with this version. The introduction of the larger virtual page, expandable to a 2,500- by 3,000-pel limit, has opened up the possibilities for greater detail and large document processing. This added feature has also created an added inconvenience. When creating a 2,000 by 2,500 virtual pixel image, the page-file creation takes as long as 2 minutes on a 286-based machine. Retrieving that file can take up to 20 seconds.



One of PC Paintbrush Plus*'s best improvements is the addition of three more palettes for a total of 64 colors available on an EGA.*

With Z-Soft's Frieze utility, the program's output has limitless boundaries. Increasing or decreasing the size of your output and changing the aspect ratio is a simple task.

The default palette and accompanying patterns are an improvement over the original program. Now you have the ability to access the other 48 EGA colors, in sets of 16.

If you are patient and can put up with slow image access, then you will like the larger work area and added colors. But if you don't need the extra space, the original *PC Paintbrush* at $95 is the better choice.

List Price: *PC Paintbrush Plus*, $149. **Requires:** 320K RAM, one disk drive, graphics display, mouse or tablet, DOS 2.0 or later. Not copy protected. Z-Soft Corp., 1950 Spectrum Circle, #A-495, Marietta, GA 30067; (404) 980-t950.

CIRCLE 448 ON READER SERVICE CARD

Whoops! Catches Typos, Has Thesaurus

PC HANDS ON

BY CATHERINE D. MILLER

If you like dealing with your mistakes as they occur, Cornucopia Software's *Whoops!*, a real-time spelling checker with a thesaurus, stands ready to beep at nearly every typo you make.

The spelling checker operates in either an interactive real-time mode or a screen-proof-read mode. The main dictionary contains 50,000 words; you can add another 15,000 words to a separate expandable dictionary.

In real-time mode, *Whoops!* beeps when it catches an error. If you want to check the word, hit Alt-Right Shift to display the dictionary and possible correct spellings; *Whoops!* will automatically correct your text.

The screen-proof mode allows you to type without interruption until you press Alt-Right Shift to proof the screen. All of the unknown words are highlighted and can then be checked against the dictionary.

The 90,000-word thesaurus, accessed through 12,000 root words, is comparable in size to many standalone thesaurus programs, and unlike a number of them, you can pursue a synonym search until you find the word you are looking for.

Whoops! works with many word processing programs, including *WordStar*, *MultiMate*, *Microsoft Word*, and *PFS:Write*, but not with *WordPerfect* or *XyWrite*.

A good integration of a spelling checker and a thesaurus, *Whoops!* is a real buy at only $49.95.

List Price: *Whoops!*, $49.95. **Requires:** t28K RAM, two disk drives, DOS t.0 or later. Not copy protected. Cornucopia Software Inc., P.O. Box 6111, Albany, CA 94706; (415) 528-7000.

CIRCLE 449 ON READER SERVICE CARO

Silencer Offers Cool, Quiet Power

PC HANDS ON

BY EDWARD MENDELSON

That shiny metal box in the far corner of your plain-vanilla PC contains a power supply that doesn't supply enough power and a noisy cooling fan that doesn't cool. Yes, its 63 watts will drive a PC, though the noise from the whirring fan may drive you to distraction. But when you start adding a hard disk and expansion boards, you may run into trouble from inadequate power and excessive heat. The problem isn't the fried egg you can cook on the computer—it's the scrambled data you'll find on your disks.

The best scramble-preventer is a replacement power supply. The one to choose is the Silencer 150 from PC Cooling Systems. The Silencer provides 155 watts worth of juice—30 more than IBM builds into the PC-XT. Its fan is powerful enough to keep my stuffed PC running cool all day but so quiet that I can't imagine how I ever lived with the roaring monster provided by IBM.

If you use furnace-emulation hardware such as turbo boards, network cards, or double hard disk drives, you may need more cooling than even the Silencer can give you. Try the Turbo-Cool 150 for 155 watts or the Turbo-Cool 200 for 200 watts if your power requirements are even greater. In most cases, the Silencer can keep an over-achieving computer cool and comfortable—and quiet.

List Price: Silencer 150, $149; Turbo-Cool 150, $159; Turbo-Cool 200, $t99. PC Cooling Systems, 3t5t0 Mountain Way, Bonsall, CA 92003; (619) 723-9513.

CIRCLE 450 ON REAOER SERVICE CARO

Corporate Maneuver.

In the high-pressure corporate environment, every move counts. It's no wonder, then, that many corporate PC users are reaching for WordPerfect for powerful word processing.

Reaching the top.

WordPerfect is now the best-selling word processor for the IBM PC, according to market research firm InfoCorp. And customers like Ford, Chrysler and TRW are leading the way.

Meeting user needs.

But WordPerfect's climb to the top was no overnight success story. For the past three years, user feedback has been applied to each new version of WordPerfect, pushing it closer and closer to perfection.

The result is WordPerfect 4.2, a word processor with unsurpassed business features for the IBM PC and compatibles. Features like an elegant thesaurus, a 115,000-word spelling dictionary, document summary, columns displayed side-by-side on screen, windows, line drawing, statistical typing, and extensive printer support.

Make your move.

There is a word processor that is as productive for executives as it is for secretaries. WordPerfect 4.2. It's the consummate corporate maneuver. For more information, call or write WordPerfect Corp., 288 West Center St., Orem, Utah 84057, (801) 227-4000.

WordPerfect CORPORATION

WordPerfect versions available for Apple IIe/IIc/IIcs and Data General Versions coming for Macintosh, VAX VMS, Amiga and Atari ST. Features and prices vary.

CIRCLE 513 ON READER SERVICE CARD



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Jet 386 is the Ultimate Accelerator Upgrade for Your AT

Announcing an end to obsolescence. Orchid Technology's Jet 386™ accelerator card extends the life of your computer investment into the 1990s—it puts power in your AT that you won't outgrow.

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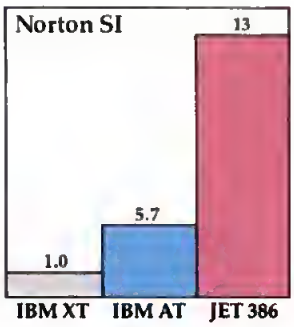
Easy Upgrade

Easy to use, there's nothing new to learn and no new programs to buy. At 25% of the cost of buying a new 386 PC, it's easy on your pocketbook, too.

From the People Who Started It All

Orchid combined 80386 power with the technology perfected for the XT in the TinyTurbo and PCturbo 286e. Like these critically acclaimed accelerators, Jet 386 is built for lasting value.

Call Orchid to find out how you can experience the future today. And ask how Orchid can modernize your whole office with turbos, graphics, networking, and multifunction products.



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Building for the Future

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Today's 386 compatibles fall into two categories:

Those that "enhance" technology.

The PC Designs GV-386 is not an enhancement. It's the fastest 80386-based compatible you can buy.

That's because the engineers here at PC Designs realized early on that to take full advantage of the 80386 chip, an equally revolutionary motherboard was needed.

So they started with a blank piece of paper and—from the ground up—designed a 80386 micro that blows the doors off every other compatible available.

Get Power Hungry

At the heart of the GV-386 is a 32-bit processor operating at 16MHz clock speed; keyboard switchable to 8MHz (it will even support 24MHz operation, once Intel makes that available).

And that's Zero Wait State clock speed, thanks to a specially-designed, high-speed memory cache circuit. When enabled, this unique circuit—with a full 64K of static RAM—allows you virtually instant data retrieval 80 percent of the time.

The cache circuit—a PC Designs exclusive—also ensures rock-solid reliability because it eases the load high speed puts on the integrated circuits. Even at zero wait state, the GV-386 never exceeds IC design specifications.

Radical, but compatible

Despite its radical innovations, the GV-386 was designed to retain the standard 8MHz IBM PC-AT bus timing. The result is unparalleled compatibility with existing software and hardware.

And every GV-386 is bundled with Desqview 1.3 from Quarterdeck Office Systems, giving you both expanded memory management and multitasking capabilities allowing up to nine simultaneous operations.

Affordable power

If all this speed and performance doesn't blow you away, take a look at the price: The standard system starts at around $4000. And it's available now.

The fact is, it's the most innovative compatible to date. So why settle for an 80386 machine that just "advances" technology, when the GV-386 blows it away?

And those that blow it away.



PC Designs

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Broken Arrow, OK 74012

19 Rector St., Suite 2705
New York, NY 10006

Call us now in New York: 1-212-514-7280, in Tulsa 1-918-251-5550

CIRCLE 373 ON READER SERVICE CARD

Surprise! Boosts PC, XT Processor Speed, Avoids Compatibility Problems

PC HANDS ON

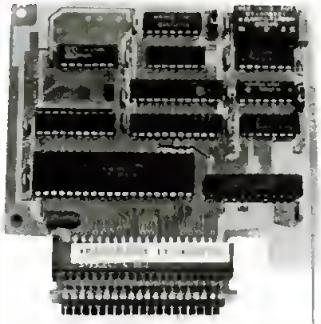
BY MITT JONES

Maynard Electronics has been at work on Surprise! since we last looked at the no-slot PC speed-up board (see "The No-Slot Alternative to Acceleration (And Why It Makes Sense)," *PC Magazine*, Volume 5 Number 15). The result of its effort is a good-natured, moderately fast accelerator board that is easy to install and relatively easy to live with.

The latest version of Surprise! can operate your PC at high speed with an 8087 math coprocessor unless you are performing floating-point operations. Past versions could run only at an intermediate speed with the 8087.

Other enhancements include the ability to change the "hot key" that toggles the board from slow to fast speed (the default is Ctrl-Alt-Backslash). You also can eliminate the Surprise! keyboard buffer to avoid possible clashes with memory-resident programs.

Surprise! boosts performance significantly, especially during math-intensive applications. A PC Labs (Release 3) Lotus *1-2-3* macro benchmark test ran two-thirds faster with Surprise! than without.



The Surprise! board installs easily into your PC's 8088 socket.

Since Surprise! doesn't tamper with your PC's 4.77-MHz clock rate (see sidebar, "A Careful Approach to Gaining Speed"), you don't have to worry about how well your machine's circuits will operate at a faster rate.

To install Surprise! you replace your system's 8088 processor chip with an edge connector and then plug the Surprise! daughterboard into the connector. After a brief and well-thought-out software installation procedure, you're up and running.

Surprise! functioned flawlessly with each PC and all of the software I tried—a significant advantage over many other, more-finicky speed-up devices that *PC Magazine* has tested.

At $249, Surprise! is not a small investment, and the board won't add quite as much spunk to your system as other, less-expensive boards will. However, if you would rather have an accelerator board that spares you the pain that often comes with accelerator schemes, then Surprise! is definitely a buy.

A Careful Approach to Gaining Speed

Surprise! attacks the PC speed problem from several angles.

The heart of the accelerator is a special 10-MHz NEC V20 processor. But instead of adding a new crystal to your PC to pace the V20 at a fast rate as many speed-up boards do, Surprise! in effect doubles the 4.77-MHz signal coming from the motherboard to run the V20 at 9.54 MHz.

When the processor is sending instructions out through the bus, where a rate faster than 4.77 MHz could cause problems, Surprise! sends wait states to the processor so that it appears to be running at 4.77 MHz.

Since the speed increase applies only to the processor's internal operation and not to I/O tasks, Surprise! includes memory-resident software to boost video display, keyboard, and memory access performance.

The software comprises more-efficient versions of some DOS interrupts and can be disabled at will. PC Labs tests showed dramatic video display and memory access speed increases from the software coupled with the Surprise! board.

—Mitt Jones

PC MAGAZINE FACT FILE

Surprise!
Maynard Electronics
460 E. Semoran Blvd.
Casselberry, FL 32707
(305) 331-6402
List Price: $249
Requires: IBM PC, XT, or compatible; DOS 2.0 or later.
In Short: An easy-to-install, no-slot accelerator board that will add pep to your PC while causing few, if any, problems.

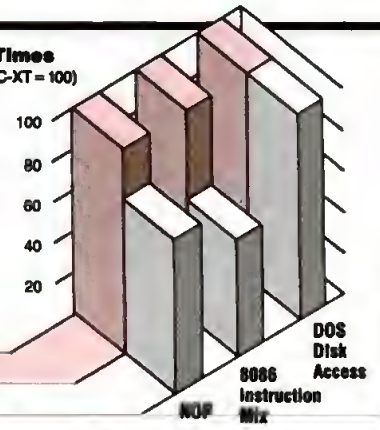
CIRCLE 428 ON READER SERVICE CARD

PC LABS Benchmark Tests: Surprise! vs. IBM PC-XT

Maynard Electronics' Surprise! outperformed the stock IBM PC-XT despite the wait states that Surprise! must inject to ensure compatibility. In addition to boosting processor speed, Surprise! speeds memory access and video display with memory-resident software.

Performance Times
(Times given in seconds except where noted)

Product	NOP	8086 Instruction Mix	DOS Disk Access (milliseconds)
IBM PC-XT	10.11	32.02	238.10
Surprise!	7.69	18.23	237.98

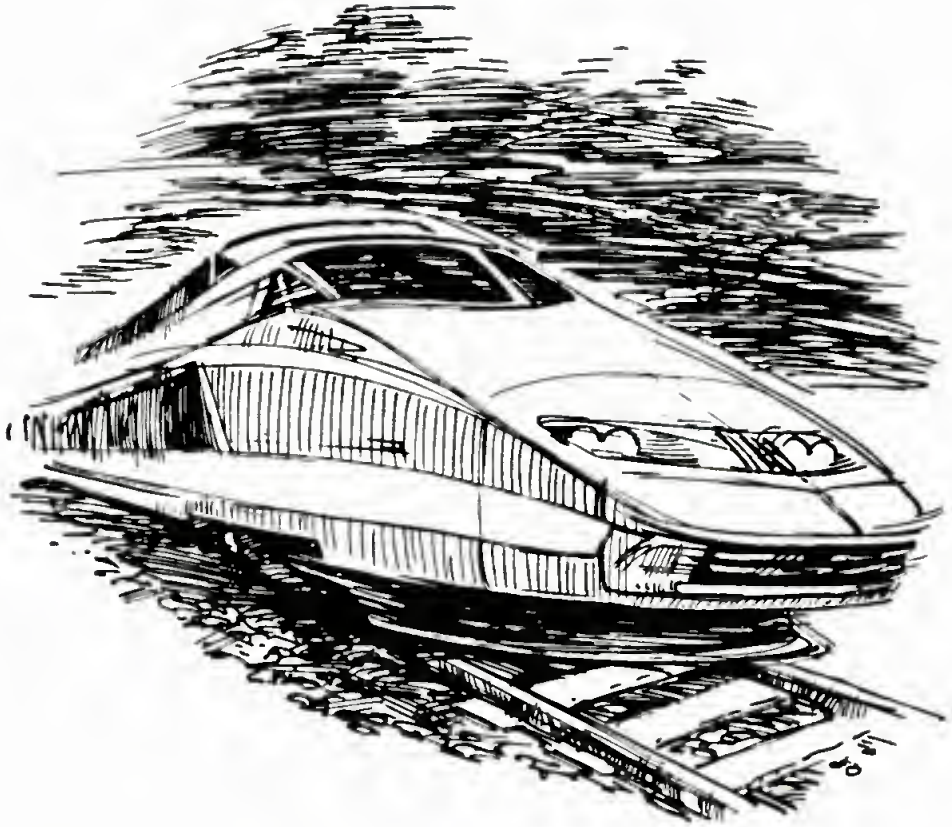


The NOP benchmark test is designed to measure raw clock speed and memory access time while minimizing differences in microprocessors and the effect of memory caching. This test executes almost nothing but NOP ("No Operation") machine code instruction in a big 128K loop.

The 8086 Instruction Mix benchmark test measures the time it takes to execute a selected series of processor-intensive tasks. The test program uses 8086 instruction code. These instructions are a subset of the total processor instruction set.

The DOS Disk Access benchmark test measures the time it takes to do a random sector read using DOS. DOS buffers are set at 3 and the interleave factor is left at the driver's default setting. This test adds DOS's overhead to the BIOS and hardware times. The test program performs the sector read 1,000 times within the DOS disk partition. The average result is shown in milliseconds.

Photograph: Thom O'Connor



How a French train inspired the fastest 286 micro you can buy.

Not just any French train, but "La Grande Vitesse"—"The High Speed!" It's the fastest train in the world, routinely eating up steel track at speeds normally associated with small aircraft.

It was during such a screaming ride that we christened our new, high-speed micro . . . a superfast 12MHz 80286 microprocessor operating at Zero Wait State.



"Grande Vitesse" means high speed—in this case, 12Mhz with no wait states.

We call this remarkable compatible the "GV" 286, and it's the very first 12MHz No-Wait-State micro available outside a research laboratory.

To design a machine that operates reliably at 12MHz with no wait states, our engineers had to come up with some major innovations. And they did.

A power user's dream

The GV-286 is the first 80286 micro to include a high-speed RAM cache circuit, making data retrieval from the processor almost instantaneous. It's the same design feature that makes our new GV-386 the fastest machine in that rarified category.

The cache circuit also assures high reliability, allowing the GV-286 to operate at super-high speeds without pushing its integrated circuits beyond their design limits. Other 12MHz machines put their ICs through hell to achieve high speed, and that means they're inherently less reliable.

Yet with all this speed and design innovation, PC Designs engineers—unlike other manufacturers—have customized the BIOS and retained the standard IBM PC-AT bus timing (yet another PC Designs exclusive). The result is unparalleled compatibility with existing software and peripherals.

There's a boxcar load of other design features and the GV-286 can be ordered up in virtually any configuration you can imagine. Best of all, standard systems start at less than $4000 (including Desqview multitasking software).

Enter the No-Wait-State

If you've been holding out for a 80286 micro with the speed of a bullet train and the reliability of the family station wagon, your wait state is over.

PC Designs

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CIRCLE 372 ON READER SERVICE CARD

OfficeWriter's Enhancements Put Polish on the Printed Page

PC HANDS ON

BY CATHERINE D. MILLER

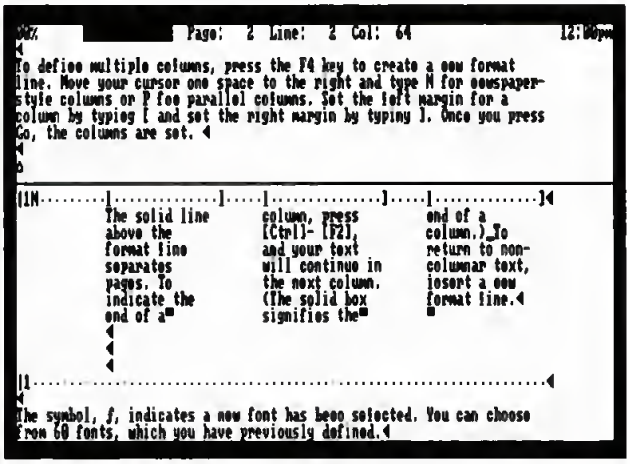
OfficeWriter has played a major role in the transition from Wang dedicated word processors to full-featured PCs for many businesses. As the Wang system fades into memory, PC word processors continue to treat you to a wealth of sophisticated features.

The latest release of *OfficeWriter* incorporates more than 30 new features into its logical command structure, while staying consistent with its earlier versions. *OfficeWriter* is still easy to learn, but it's now faster and more powerful.

The switch from page to document orientation is an extreme departure from the Wang system. With Version 5.0 you can scroll to the top of one page while the bottom of the previous page remains on-screen.

Several enhancements work to make the printed page look more polished. You can choose from 60 fonts while editing a document, and microjustification is possible. Orphan and widow control can prevent single words and lines from being stuck at the top or bottom of a page.

You can specify up to 15 columns on a page, either by snaking text newspaper-style or by making parallel tabular columns. The format line is used to mark off columns, making it easy to visualize column placement—faster and simpler than it is in *WordPerfect*, which has been the traditional program of choice for anyone who needed to set up multiple columns.



From the format line of Office Solutions' OfficeWriter, *you can mark off up to 15 newspaper-style or parallel columns on a page.*

PC MAGAZINE FACT FILE

***OfficeWriter*, Version 5.0**
Office Solutions Inc.
2802 Coho St.
Madison, WI 53713
(608) 274-5047
List Price: $495; upgrade for Versions 3.5 and 4.0, $75 (if purchased within the past 90 days, free).
Requires: 256K RAM, two disk drives, DOS 2.0 or later.
In Short: Version 5.0 enhancements, including some desktop publishing features, are carefully integrated, keeping the program current without abandoning its logical structure. Not copy protected.

CIRCLE 429 ON READER SERVICE CARD

Other new features include a 40,000-word thesaurus, the ability to create a table of contents, and automatic index generation.

With *OfficeWriter* 5.0, Office Solutions is keeping in the forefront of corporate word processing advances, without forgetting current users. PC

Polaroid Palette Merits a Plus For Adding EGA Compatibility

PC HANDS ON

BY WINN L. ROSCH

The Polaroid Palette has many advantages as a film recorder—it is inexpensive, offers good quality, doubles as a screen camera, and can make a photograph of any image that appears on your PC screen. Its biggest shortcoming is that, despite the recent improvements in display standards, it remains compatible with only the IBM Color Graphics Adapter (CGA) and compatibles.

Not so the new Polaroid Palette Plus. Polaroid has endowed the latest model of its film recorder with EGA (Enhanced Graphics Adapter) imaging abilities without removing the advantages of the older model, which remains available.

The big differences between the old and new Palettes are their internal electronics and the connection they make with the host computer. In addition to the serial port used for control signals, the Palette Plus plugs into the EGA output of your PC, and then your EGA monitor plugs into the Palette Plus.

This loop-through connection allows the Palette Plus to modify the monitor display to give a better preview of the final, on-film image, which Palette software can augment with up to 72 colors.

EGA abilities almost double the resolution of screen photos and the images made with software having drivers written specially for the Palette Plus—up to 640 by 700 lines.

The same camera backs (which hold the film) are supplied with the new Palette Plus as with the old model—a dedicated 35mm automatic threading and winding mechanism and a 3¼- by 4¼-inch Polaroid pack film holder for instant black-and-white or color prints and Colorgraph Overhead Projection Film.

Even with the $1,000 premium over the price of the older Palette ($1,995) that Polaroid charges for the new model, the Palette Plus nevertheless ranks as the easiest and least expensive way of getting images of its quality level onto film.

[Editor's note: next issue's cover story will include a comparison of the Polaroid Palette with other image recorders.] PC

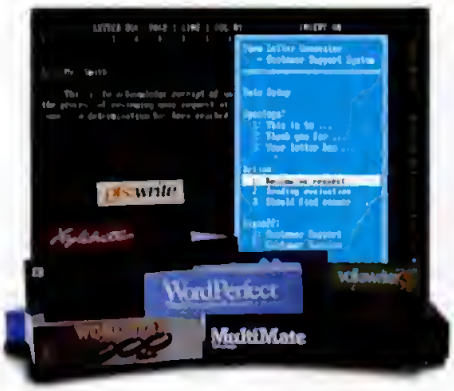
PC MAGAZINE FACT FILE

Polaroid Palette Plus
Polaroid Corp.
Electronic Imaging Department
575 Technology Sq.
Cambridge, MA 02139
(800) 225-1618
List Price: $2,995
Requires: CGA or EGA board, serial port.
In Short: A device that makes film images (35mm, 3¼- by 4¼-inch, or 3- by 4-inch Auto-Film) of video displays or software graphics in 72 colors with resolution up to 640 by 700.

CIRCLE 430 ON READER SERVICE CARD

Flash-Up Windows™ puts menus and help windows in everybody's software.

Theirs.



Theirs.



Theirs.



And even yours.



Whether you bought your software or built your software—Flash-Up Windows makes it faster, better looking and easier to use.

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Lotus HAL Lets You Do More With (And Get More From) 1-2-3 Than Ever Before.

Lotus HAL™ is a memory resident companion product for Lotus 1-2-3® that enhances the full range of 1-2-3's capabilities—and adds new ones.

It increases 1-2-3's power and flexibility, so you can work more efficiently and become more productive than ever before.

Benefits For All 1-2-3 Users

Lotus HAL works by giving you easier access to all of 1-2-3's numerous capabilities. And it's extremely useful for 1-2-3 users of all levels.

If you're new to 1-2-3, Lotus HAL will let you use it with greater confidence and speed.

If you're familiar with 1-2-3, Lotus HAL will make it easier for you to access additional power and capabilities.

And if you're an advanced 1-2-3 user, Lotus HAL will show you new features and functions that will add extra flexibility to the power of 1-2-3 you've already tapped.

How does Lotus HAL do all this—for all users?

Easier Commands

Lotus HAL makes executing 1-2-3 procedures even easier than before. Because it accepts phrases like "total sales," "graph Jan to Mar," or "copy this to A10," etc. In fact, Lotus HAL's vocabulary includes English words and phrases. So you can customize a command dictionary of your own—with the words and operations you're most used to and most comfortable using.

Since Lotus HAL makes 1-2-3 more accessible for all users, you'll learn more—in less time—about all the capabilities of 1-2-3.

For instance, if you're presently using only the spreadsheet, Lotus HAL will show you how to create graphs and do database functions—far more simply than ever before.

Time-Saving Shortcuts, Easy-To-Create Macros

With Lotus HAL, you'll take shortcuts and accomplish multi-step tasks quickly and easily. So you'll greatly reduce errors—and save time.

And, with a simple "undo" command, Lotus HAL even lets you recover from errors you've already made. So if you're a novice user, you'll learn faster and with greater confidence. And if you're an experienced user, you can experiment more freely and do "what ifs"—without fear of having a mistake destroy hours of work.

Lotus HAL also makes developing macros simpler than ever—so simple, in fact, that even novice users can create 1-2-3 macros with Lotus HAL. And no matter how familiar with 1-2-3 you are, you'll benefit from being able to write and test macros to make sure they do what you had in mind.

New Power

Lotus HAL will let you take 1-2-3 as far as you need. And if you've been taking it far already, Lotus HAL offers you new commands that will further enhance your productivity.

For example, Lotus HAL lets you replace items anywhere in the worksheet (even within formulas), and create a dynamic link between cells in multiple worksheets. It also lets you audit your worksheet—so you can find mistakes without having to review the entire sheet "manually."

Best of all, while Lotus HAL greatly enhances 1-2-3's commands, it doesn't change either 1-2-3 or the worksheet. It's always available, but it never gets in your way. And you can share data as freely when you're using Lotus HAL as you did when you were using 1-2-3 alone.

In fact, you can do everything you've ever done with 1-2-3 even better...plus a great deal more.

And since Lotus HAL is part of the 1-2-3 system—and the Lotus family—you get an unparalleled commitment to customer service and support that will keep you up and running.

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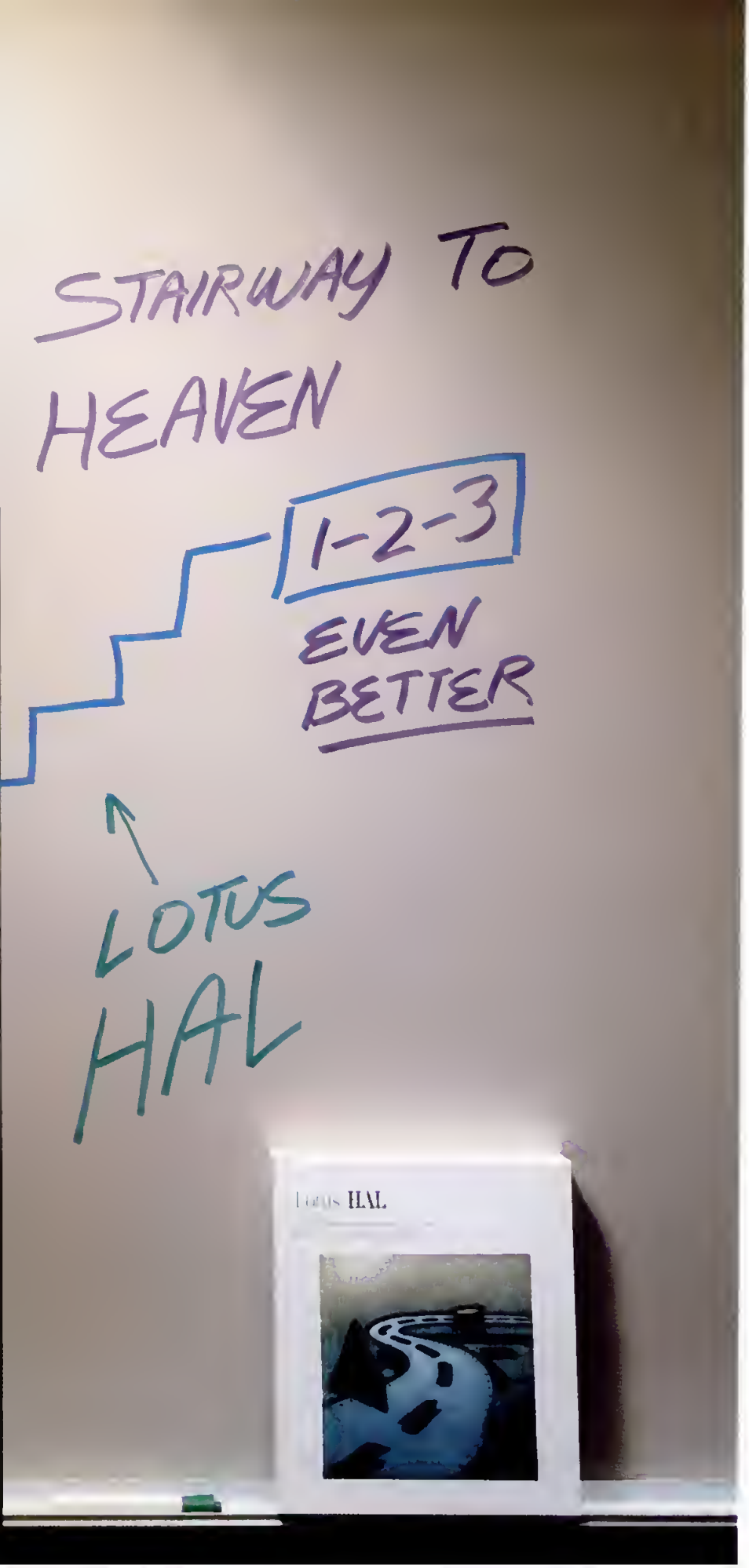
System Requirements.

Lotus HAL requires 1-2-3 Release 1A, Release 2 or Release 2.01 for personal computers from IBM* COMPAQ and AT&T plus 1-2-3 Certified Compatibles. DOS 2.0 or higher. Please refer to your 1-2-3 package or 1-2-3 documentation for appropriate hardware configurations and DOS requirements or consult your dealer.

Lotus HAL resides in memory with 1-2-3 and operates with it, a minimum system configuration of 512K is required.

*Lotus HAL does not operate with 1-2-3 for the IBM PCjr (ROM version), IBM PC Convertible or Release 1A for the IBM 3270 PC.





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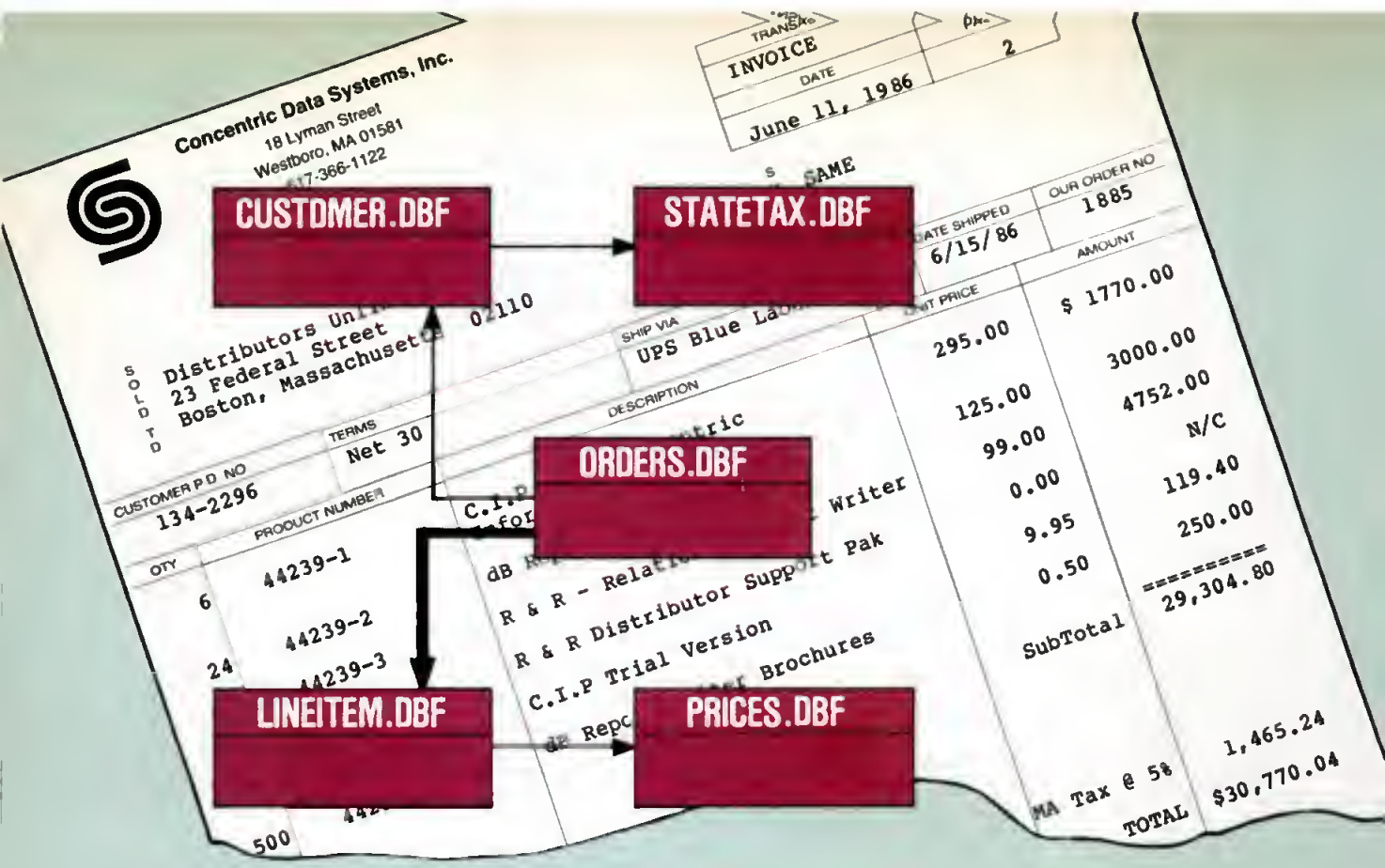
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When you purchase Lotus HAL directly from Lotus, take your first 30 days to try it out. If after 30 days Lotus HAL does not perform as described and you've purchased it directly from Lotus, we'll gladly give you a full refund.



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CIRCLE 315 ON READER SERVICE CARD

■ PC UPDATE ■ PEGGY GAVAN

Lotus Development Corp. has extended indefinitely its program to let registered users upgrade from Releases 1.0, 1A, and 2.0 of *1-2-3* to Release 2.01. The program was originally scheduled to end on December 31, 1986. Customers can upgrade from Release 1.0 or 1A for $150 or from 2.0 for $15. Individual users who upgrade less than 100 copies should call (800) TRADEUP for an Upgrade Information Kit form. Lotus Development Corp., Cambridge, Mass.; (617) 577-8500. Corporate accounts should contact their Lotus sales office.

* * * * *

SoftLogic Solutions has enhanced and removed copy protection from ***DoubleDOS***, Version 4.0; ***Disk Optimizer***, Version 2.0; and ***Software Carousel***, Version 2.0. *Disk Optimizer*'s performance time was improved, and it was given the ability to target selected disk areas for faster access. ***DoubleDOS***, in addition to running faster, will now support EGA 43-line displays. The new version of *Software Carousel* enhances performance time when using hard disk space for applications swapping and now supports MS-DOS 3.1 and PC-DOS 3.2. In addition, the prices of *Disk Optimizer* and *Software Carousel* have each been raised $10, to $59.95, while *DoubleDOS* remains at $49.95. Upgrades are $15, plus $2.50 shipping and handling for each product. SoftLogic Solutions, Manchester, N.H.; (800) 272-9900.

* * * * *

Panasonic Industrial Co. has cut the prices on its Business Partner series of PC compatibles and on its wide-carriage dot matrix printers. The **Business Partner 286** dropped $746, to $2,249, and the single-drive version decreased almost $700, to $2,099. The **KX-P1595** and **KX-P1592** printers were reduced to $799 and $669, respectively. Panasonic Industrial Co., Secaucus, N.J.; (201) 348-5200.

* * * * *

Windows Clip Art Collection, Version 2.0, includes more than 500 object-based images and a "How to" guide for using the clip art with *Microsoft Windows* applications. The new version will be sold bundled with Micrografx's $299 ***Windows Draw*** or as a separate package for $99.95. Upgrades are $49.95 for registered users. Micrografx, Richardson, Tex.; (800) 272-3729.

* * * * *

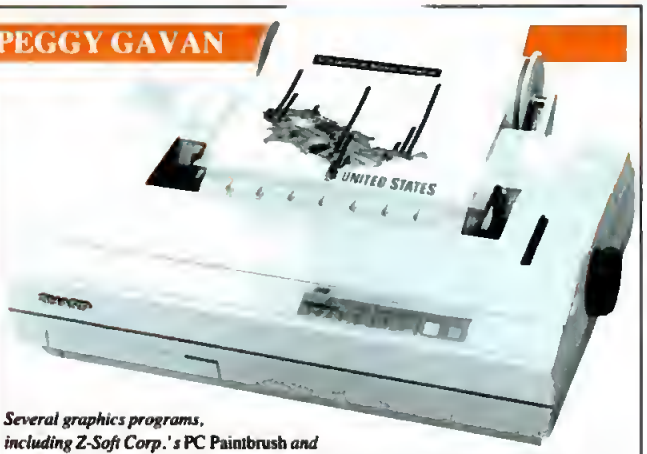
HomeBase, Version 2.5, features ***PowerMenu***, a DOS operating environment that displays directories and files and provides menu-driven access to DOS commands. The new version also has larger memory-resident files and expanded report-writing capabilities. Upgrades are $29.95, plus $5 shipping. Customers can also purchase *Power Menu* as a standalone product for $89.95. Brown Bag Software, Campbell, Calif.; (408) 559-4545.

* * * * *



Honeywell's microLynx 3 brings trackball technology to the IBM PC AT and compatibles. Lynx pointing devices operate like a mouse but they share the PC's keyboard port.

Honeywell has added the **microLynx 3** cursor pointing device to its line of **Lynx** trackballs. The new version is designed to function with IBM PC, XT, and AT keyboards, as well as most IBM-compatible keyboards. Like Honeywell's earlier microLynx, it shares the computer's keyboard port. The microLynx retails for $159. Honeywell, Costa Mesa, Calif.; (714) 979-5300.



Several graphics programs, including Z-Soft Corp.'s PC Paintbrush *and Enertronics Research's* Energraphics, *Version 2.0, have added drivers for Sharp Electronics Corp.'s JX-720 ink jet printer.*

SoftCraft is shipping ***FancyWord***, Version 2.41, a standalone print enhancer for use with *Microsoft Word*, Version 3.0. New features include perfect text positioning on laser printers, color printing capabilities, and improved error detection. In addition, the Efont and Cfont utilities (which allow font modification and font creation, respectively) included in SoftCraft's ***Fancy Font*** and ***Laser Font*** packages are now available as $50 options to registered *FancyWord* users. SoftCraft has also released *Fancy Font*, Version 2.5. The new version supports up to 640K bytes of memory and 256 character fonts. Upgrades to both products are $25. SoftCraft, Madison, Wis.; (800) 351-0500.

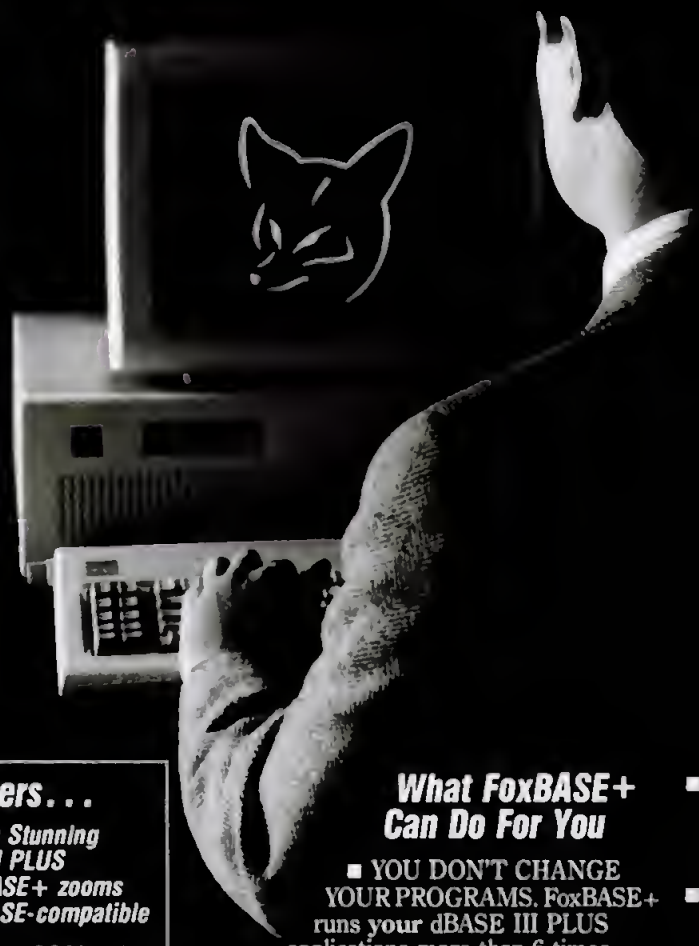
* * * * *

Several graphics software developers have added a driver for Sharp Electronics Corp.'s **JX-720** ink jet printer to its graphics packages. The products now supporting the printer include Visual Communications Network's *VCN Concorde*; Media Cybernetics' *Dr. Halo II*; Z-Soft Corp.'s *PC Paintbrush*; Enertronics Research's *Energraphics*, Version 2.0; and all Decision Resources graphics packages. The JX-720 retails for $1,395. Sharp Electronics Corp., Mahwah, N.J.; (201) 529-9500.

* * * * *

In brief: Lifetree Software has released a new version of ***Words & Figures*** to correct a bug that occurs when users insert a spreadsheet file into a text paragraph. Version 1.01 is available free to all users. Lifetree Software, Monterey, Calif.; (408) 373-4718...**PreCursor**, Version 3.0, offers several new features, including an instant path finder, file finder, and disk space warning signal. Upgrades are $34.95. The David L. Aldridge Co., Houston, Tex.; (713) 953-1940...Ven-Tel has reduced the prices on its modems by up to 30 percent. Prices range from $399 for the **Half Card 1200** bundled with *Crosstalk XVI* to $599 for the **Half Card 2400** with *Crosstalk XVI*. Ven-Tel, Santa Clara, Calif.; (408) 727-5721...The ***Open Access II Database*** and ***Open Access II Spreadsheet*** modules, usually packaged with the ***Open Access II Modular Software System***, are now available as standalone products for $395 and $295, respectively. The *Modular Software System* will continue to retail for $595. Software Products International, San Diego, Calif.; (619) 450-1526...SourceMate Information Systems is bundling Proximity Technology's ***Friendly Finder*** software with its ***AccountMate*** accounting modules until March 31. *Friendly Finder* provides artificial intelligence techniques, including query and search functions. SourceMate Information Systems, Mill Valley, Calif.; (415) 381-1011...Advanced Logic Research is bundling ***DESQview***, Version 1.3, with its **Access 386** line of 80386-based PCs. Advanced Logic Research, Irvine, Calif.; (714) 581-6770...***QuickPak***, Version 5, has added utilities to print any portion of a string array and to scroll any portion of the display horizontally. Crescent Software, East Norwalk, Conn.; (203) 846-2500. PC

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CIRCLE 114 ON READER SERVICE CARD

■ FROM THE EDITOR'S SCREEN ■ BILL MACHRONE

THE COPYRIGHT FIGHT



License agreements and the scope of copyright coverage are changing. PC Magazine's copyright policy on its programs and utilities is changing, too.

Copyright law goes back a long way. The original idea that a person's ideas as represented in a creative work could be protected legally is a powerful one. Logically, it extends to corporations as well as individuals.

At *PC Magazine*, we have been criticized (perhaps justly) for our copyright policy on the programs and routines we publish as part of the Programming/Utilities, PC Lab Notes, and Power User columns and elsewhere. Frankly, we didn't give it too much thought at first. Magazines customarily copyright everything in each issue, and the programs just came along for the ride.

Not copyrighting things is dumb. It just gives other people license to steal by using your work and making money on your talents. Even if your intentions are good and you want to let the world share your creation, there's nothing to stop someone else from making a minor modification, copyrighting the changed product, then building a fence around it by copyrighting it himself. Copyright is essential if you want or need to control the destiny of your creations.

BULLETIN BOARD A few years ago, when we first started publishing programs they were just pieces of code that illustrated programming techniques. Along the way, they started becoming functional, handy utilities. If you wanted a copy of the program, however, you had to type it in by hand. Around the office, we talked for a long time about ways to make the source code and the .COM files more easily available. We discussed binding a diskette into the magazine occasionally or selling one for a nominal price. We thought about putting them on one of the big information services. We finally decided to put up our own bulletin board, and thus was born the Interactive Reader Service.

From its first day as a single-line PC-XT running public-domain bulletin board software, the IRS was blocked solid with calls. Back then I confidently predicted that six lines would handle the call volume. Well, it didn't. And 12 lines didn't help, either. The phone company was in an unending furor as your demand for *PC Magazine*'s utilities made a mockery of AT&T's carefully crafted statistical basis for running the nationwide network. We didn't break saturation until we got up to 18 lines, and it's still pretty busy.

Each and every one of those callers confronted a singularly unfriendly copyright message, informing them that they could download the software and use it for noncommercial purposes but were forbidden to copy it or upload it to bulletin board systems. That's about par for copyrighted software. But with time, it became increasingly apparent that run-of-the-mill copyright words were interfering with our noncommercial objective: the widespread dissemination of useful utilities and programming techniques.



It also forced us into some ludicrous stances. For instance, it's perfectly legal for you to take your copy of this magazine, type in the utility program, and use it. Then you give the magazine to an associate, and she does the same. Nothing illegal there. What you couldn't do under the old copyright provision is type in the program and give a disk copy to your associate. Likewise, even though one of our goals is to educate, a professor could not legally download a routine from the IRS and distribute copies to a computer science class. Those who had modems or untiring fingers were in luck; everyone else was out in the cold legally.

We've changed all that. Now the copyright notice on the Interactive Reader Service specifically permits sharing the code noncommercially. That'll be a big relief to bulletin board sysops who used to panic every time someone uploaded a *PC Magazine* utility to their boards. Fearing prosecution for copyright violation, many sysops deleted such programs.

But even with the (if you will) decriminalization of sharing *PC Magazine* software, problems remain. The biggest one is the potential for modification. If you get a

Illustration: Cary Henne

■ FROM THE EDITOR'S SCREEN

program from the Interactive Reader Service, you can be confident that it's the real thing. If you get it anywhere else, it may bear only passing resemblance to what we published. Contributing editor Charles Petzold, one of our most prolific creators of utility software, expresses it aptly:

"I don't really care if my programs are disseminated widely—that's why I wrote them. But it bothers me to think that someone might modify them, and do it badly."

Or maliciously. One of Petzold's programs, DISKLOOK.COM, reads every sector of your hard disk and informs you of any sectors that may have gone bad. A simple 1-byte change in the program would turn the sector-read into a sector-write. The result would be irretrievable loss of data. Of course, most of our utility programs don't go so close to the hardware, but it's still a concern. The public domain has been afflicted from time to time with "Trojan horse" programs that purport to be useful and are actually disruptive or even destructive instead.

I'd hate for anyone to lose data or suffer other system problems due to modified programs, while thinking that the *PC Magazine* label was a seal of approval or a guarantee that it had been fully tested.

We spend long hours testing the routines that we publish, on every kind of machine we can get and under several versions of DOS. Executive editor Paul Somerson still tests every routine personally, part of his ongoing commitment to their quality. We often send routines back to the author for fixing and polishing. Most users care about one environment—the one they use. We have to care about all of them. The occasional bug slips through, but by and large, our code is bulletproof.

THE COMMERCIAL SIDE Some people like our programs so much that they want to use them in commercial products. We've licensed people to use several of the more handy and popular utilities. Sometimes they incorporate them into their products' code, other times they just include them in standalone form. In either case, they pay a nominal licensing fee. Lawyers like it when money changes hands in this kind of agreement. It proves that the programs have value and are worth protecting.

In any event, our utilities have been enormously popular. Some users have learned both the rudiments and the fine points of DOS and programming techniques. Others just appreciate their speed and convenience. In any event, they are an integral part of the daily computing scene. And now you don't have to worry about breaking the law as you share them with your business associates and friends.

Column: Dr. Dr. Zucker 'Cures'

The First Cure for Slot-Phobia

Sunnyvale, CA, December 1986



Many of you know me by my pretty face, full length lab coat and infamous stethoscope from our company ads (ATD), and from seeing me joking and having fun at industry functions. 2,000 people at a Comdex party started yelling for "Dr. Dr. Zucker" after some bozo band member stopped a song and announced that a famous person was at the event.

To all my fans out there, all I can say is ... thank you. To those of you who don't know what to make of me, yes, I am a little zany, and "Dr. Dr." is not a typo, but a take-off on "Major Major" in "Catch-22". Speaking of typos, a Canadian publication recently did a feature on the success we've had with our "Zuckerboard" line of add-on boards. The headline called me "The Crown Prince of Add-on Boards." Later in the story, I was called the "Clown Prince" of add-on boards. I'm not sure if that was a typo or a pretty good observation. Hey, I enjoy what I'm doing.

Although I'm a real doctor (Ph. D type), the lab coat and stethoscope symbolize the fun I get out of fixing things or making things work better. In fact, this column (the first in a series that will appear every other issue), is about one of my recent discoveries, a cure for "slot phobia".

Everyone wants to save money, be more productive and be better prepared for the future. I've come up with a prescription for each of these — ATD's new "First Cure" for slot phobia.

The "First Cure" for slot phobia is a half card primary board with 1 Meg or 128k plus 0.5 Meg of external memory that snaps into another secondary half card. Since each half card has all the power and function of a standard long card (and more), the two cards together are equivalent to two long cards in just one slot.

As with most strokes of genius, this one is so simple and obvious that everyone else overlooked it except yours truly, who came up with the idea while tinkering in my laboratory. With the First Cure, for example, you can get as much memory as you want in only one expansion slot by pairing the two half cards. The secondary board can be traded in at any time for credit toward a higher density expansion board in easy to swallow and affordable increments of 1, 2, 4 or 8 megs on the second board.

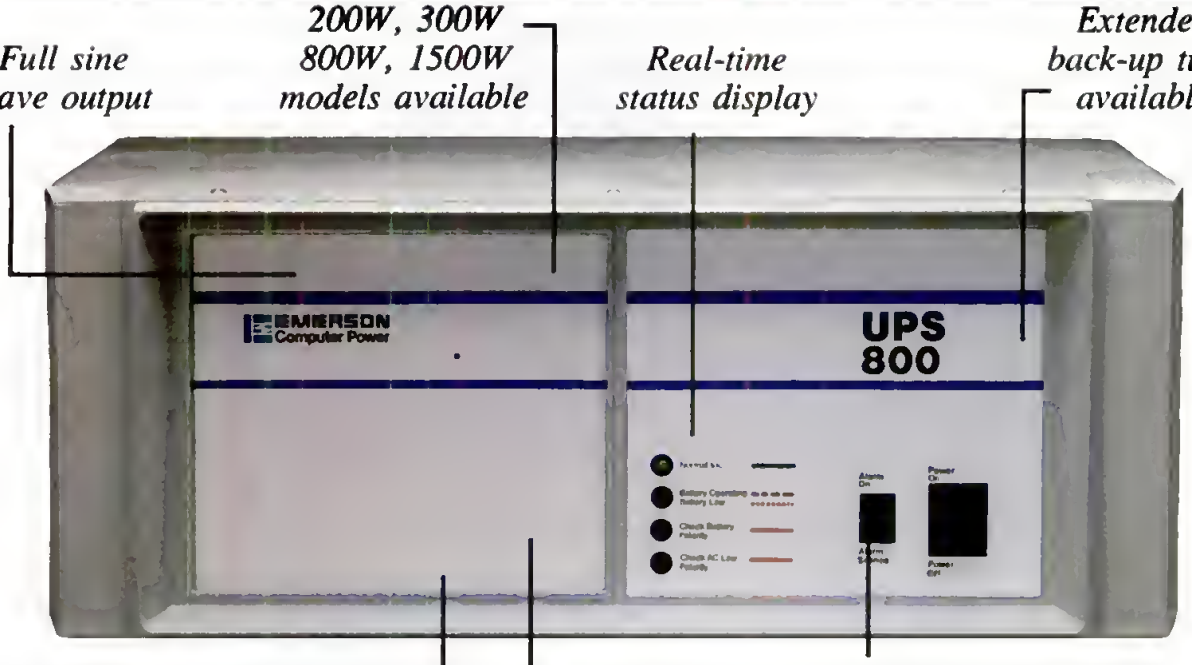
What I've done is offer users more memory now, plus upward expandability in the future without obsoleting the initial purchase or having to use up valuable slot space.

It wasn't too long ago when 64k of memory seemed like more memory than anyone knew what to do with. Two years ago, Intel and Lotus came out with the expanded memory standard — two and three megs of memory. Last year, IBM introduced DOS 3.2, which allows up to 16 megs as a virtual disk on the AT. More memory enhancement is on the horizon. Our board supports the IBM standard for the AT.

As the industry matures, users will want to add more and more memory and functions. With my cure for slot phobia, you can do this easily and economically up to 9 megabyts in a single slot. The "First Cure" is so simple, it's hard to explain in a column. It's sort of like trying to play Mozart with a kazoo rather than a full symphony. Contact us or ask your dealer for more information.

Note: Dr. Dr. Zucker (Matt Zuckerman, Ph.D.) is president of ATD, Inc. of Sunnyvale, CA, 235 Santa Ana Court, (408-720-1938).

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CIRCLE 207 ON READER SERVICE CARD

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CIRCLE 271 ON READER SERVICE CARD

■ JOHN C. DVORAK

SPACE ALIENS RUNNING MAJOR SOFTWARE FIRMS



After being captured by an alien flying saucer, our hero discovers (with little surprise) that a bunch of confused Skrej really run the software industry.

True story. It was 2 weeks ago, Thursday. I was driving from San Francisco down Interstate 280 toward Silicon Valley, minding my own business. There was a bright light in the road ahead. I figured it was some maniac in a 4 by 4 with a set of halogen flamethrowers lighting up the road for miles. I flashed the high beams to no avail and kept driving. Just as I shook my head in disgust, I saw it—an alien spaceship the size of a football field.

Before I could say anything, a green beam sucked me out of the car and into the alien ship.

I shook my head as I awoke inside a featureless room.

"You've got to go to the meeting now," a voice said over a loudspeaker. I was dazed and headed toward the smallish door that opened before me. Outside, two attractive maidens escorted me to what seemed to be the inner chamber of the spacecraft.

A ROOMFUL OF ALIENS There, inside a roundish rosewood-paneled room with a huge, round black marble table, were 20 aliens, all seated. They rose when I entered the room. I was shocked at first. They all looked like Lotus founder Mitch Kapor.

"Welcome, Mr. Dvorak. Sorry if this is an inconvenience, but it was the only way we could meet," said the man in the biggest chair. "We need your help."

I looked at him. "What can I help you with?"

"What the heck is wrong with the software business?" he asked. "We plan to relocate a few thousand more Skrej in some new software stores. The problem is, neither our software stores nor our software companies have done well. You're an expert. What's the problem?"

I was still a little befuddled by these guys. "What do you mean 'our software' and 'our software stores'?"

The aliens laughed in unison. "Well, if you haven't noticed, most software companies are run by Skrej—aliens, to you. Unfortunately, we've been unable to figure out how to make money. Nothing works for us. We need your help."

PUZZLED I was puzzled. "Well, first tell me, what discount do you offer to dealers?"

Another fellow stood up. "I'm Ydren Krod, uber-manager of all the software companies. We offer the dealers a 25 percent discount if they order 20 or more units. If they order 100 units we give them a 30 percent discount!"



A guy sitting next to Krod jumped up. "How can you expect us to make money with that kind of margin!?" He looked at me. "I'm Bmud Relaed. We need to compete with the mail-order guys. We need 70 percent discounts so we can mark the product down or no sale!"

Another stood up and shouted, "Haven't you ever heard of merchandising, you idiot! Bookstores make money, why can't you?" Then another: "It's the phoney-baloney dealers that are killing us. It's Krod's fault for signing up every Tom, Dick, and Yrrah as a dealer! For God's sake, he's even got government agencies signed up as dealers. He should be vaporized."

Krod leaped across the table and grabbed this fellow by the throat. Soon punches were flying everywhere as a horn blast sounded and bright red lights started flashing.

BEAM ME OUT OF HERE I saw my chance to sneak out the door. Outside were the two maidens. Before they could speak I said, "All hell has broken loose in there. The guy in the big chair told me to tell you to beam me back to my car before I got hurt."

That seemed to work. They looked at each other, shrugged their shoulders, and took me to the beam-down room. The next thing I knew I was back in my car.

Whew! True story. Just ask for a Skrej the next time you're in a software store. You'll see.

Illustration, Cary Henne



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Resort 460 files by EXT and ba rea y for next command	1.3	117.2	2.2	5.2	8.2	3.9	120.1
Find file on disk – worst tima	5.2	192.0 (C)	N/A	N/A (O)	30.1	33.5	106.1
Disphy directory map of drive C -Normal time	0.6	N/A	28.0	N/A	N/A	0.8	24.7
-Worst time	5.5	N/A	28.0	N/A	N/A	31.9	24.7
Return to directory list after running another program	0.1	N/A	29.9	4.2	3.0	3.0	26.8
See files on drive A, then return to map of drive C – worst time	7.2	N/A	31.1	N/A	N/A	34.7	27.6
Edit ANY file (up to 60K) in either normal or HEX mode?	YES!	NO	NO	NO (E)	YES	NO (E)	NO (E)
Intuitive, context-sensitive help?	YES!	NO	NO	NO	NO	NO	YES
PRICE	$44.95	$65.00	$49.95	$75.00	$95.00	$49.95	$39.95

These tests were performed on a standard IDS PC clone (8088 processor, 4.77 Mhz), a 20 MB Seagate drive, 53 subdirectories, 983 files.

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(A)-No "bootup" time required
(B)-Could only display 449 files
(C)-Using the DOS "TREE /F" command
(O)-Norton's "File Find" (**not** included with Commander) took 20.1 seconds
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■ JOHN C. DVORAK

INSIDE TRACK

Is IBM repeating an old mistake? Will WordStar users get a break? Will AT&T ever awake?

Will IBM take a leaf from the Vic-20 book and introduce a "soft slot" for **cartridge-based software** for use on the new 80386 machine? There sure are a lot of engineers working on so-called soft slots who think so.

"Zounds, shades of the HP 86," you say? It's nothing new for IBM. When it introduced its PC*jr*, it hoped to make the cartridge slot **a cheap way to access memory beyond any DOS boundary** (or in the case of the Junior, to maximize use of the meager 128K bytes). Look for the same hokey system on a future IBM.

Most observers feel that the **ludicrous program sizes** and concomitant long load times make the cartridge an ideal medium. One model of an IBM 80386 machine has been shown with **four of these slots**. The newer operating system allows you to instantly window from one software package to another.

It's all part of the new IBM preoccupation: **Death to the cloners!** The drawback is the expense if the finished package has a bug. Floppy disks can be recycled. Cartridges have to be buried.

80386 Bug Stopper Dept.: If you buy an 80386 machine, card, or chip, make sure you **get the B1 revision of the chip** or something newer (B2, B3, and so on). There are **far too many bugs** in the A1 and A2 versions of the chip to be acceptable. Here's what to look for: On the top line of the chip you'll see the designation A80386-16. If it says A80386-16ES, then it's an engineering sample and the vendor is a cheapskate. The samples have the revision number on the top line as A1, A2, or B1. Look no further.

For the rest of you, look at the second line on the chip. If it's S40344 then you have a B1 chip. S40334 is the A2 revision and S40276 is the A1 revision. Since the numbers are sequential, we can assume that **anything higher than S40344 is OK**. Everyone will tell you that you'll have **trouble** down the road if you accept anything less than the B1 revision of the chip.

Die-hard *WordStar* Dept.: I got an MCI memo from the guys who like to call themselves **Mel Murch and Ward Starr** (get it?). These are actually two secretive programming fiends well known for *Underground WordStar*—a cult classic book of **undocumented *WordStar* tips and features.**

Well, they're back with some **astonishing software** that is a must for anyone using *WordStar*. They're calling the package *StarFixer*, and it easily lets you customize every possible feature you ever dreamed of. That's because it's such a **dead ringer for *WordStar*** you already know how to use it. The program counts words, prevents accidental underlining, and gives you effortless printer control. It has speedup fixes, can add colors to places you won't believe, will permanently set and clear tabs ("not possible," says MicroPro's tech-support manual), adds undelete, and customizes every last toggle and setting. It fixes the normally backward Backspace and Del keys and even lets you install and customize a whole extra set of ten brand-new shifted function keys. Had enough? **It does lots more**. Buy it. Bantam is publishing *StarFixer*, but it's also available directly from the authors—$29.95 plus $2 postage to Hard/Soft Inc., Box 1277D, Riverdale, NY 10471. Hot stuff.

We Get Letters Dept.: From Wayne Brody in Monument, Colorado, comes this memo: "During my senior year in college in 1985, AT&T recruited graduates who majored in Computer Science Technology. Their basic requirement was that the student had at least a 3.9 G.P.A. You'd think with this attitude and all that brainpower, AT&T would be a leader rather than a follower."

Yes, Wayne, but the AT&T designers are governed by business school grads and old-timers. I've heard from more people that the geniuses at Bell Labs have presented a **slew of fancy computer designs** to management. Many are described as **stunning**. AT&T management, with all this homegrown brainpower, still decides to OEM an Italian computer (the Olivetti). What's the point? **It's un-American**.

Genuinely Interesting Software Dept.: I've looked at a lot of little PC calculator programs over the years and have never found a good general-purpose program. Until now. The ***Cloneware 18C*** is patterned after the HP 18C handheld Model (with or without the RPN-type entry). With **dozens of built-in functions**, preprogrammed templates, and a superb user interface, there is nothing like it. It's now the calculator I keep on my hard disk. It is optionally memory resident and was originally designed to be a *SideKick* enhancement. Recommended. Available from Advanced Logic Systems in Sunnyvale, California. Call them at (408) 747-1988. It's $89.95.

Spotting a Trend Dept.: Last December 17 marked the end of an era. The old Homebrew Computer Club (where much of the micro action on the West Coast began) said goodbye forever. It's funny how things on the West Coast come and go. There is just **no stability** there. Each region reflects its personality. In Boston there is stability. The staid **Boston Computer Society** still flourishes and will be around forever. In Texas you find bigness. The **Houston Area PC Users** group is huge—a monster club. In California things are flighty and flaky. This is because . . . **oops!** Surf's up, gotta go! Bye!

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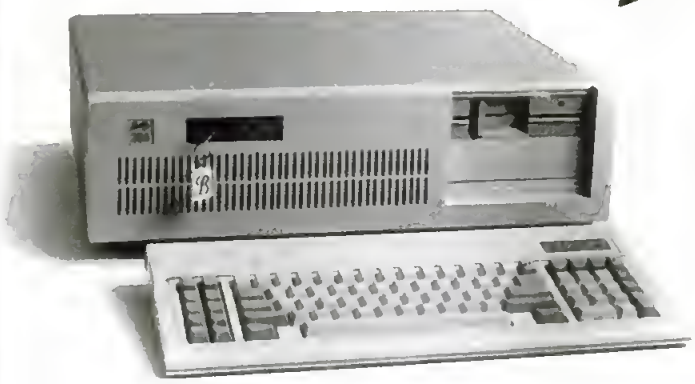
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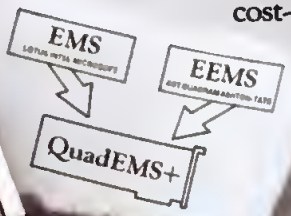
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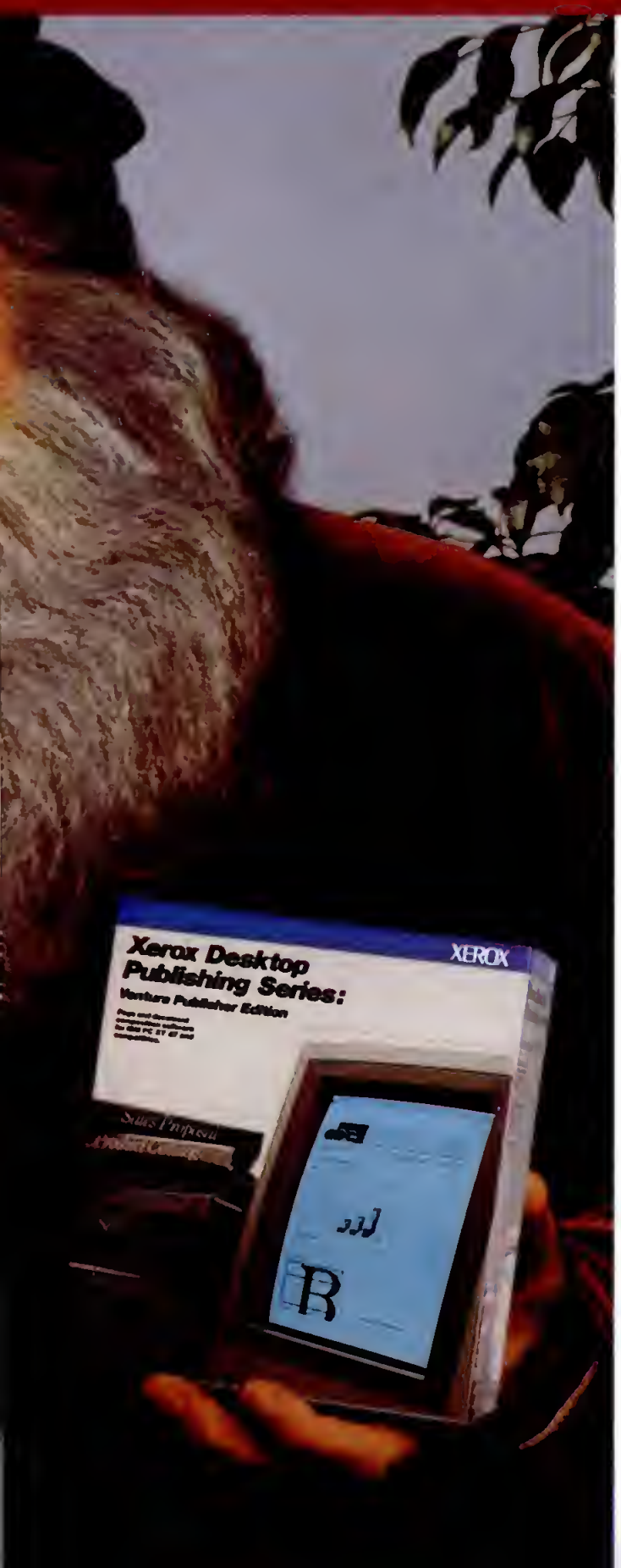
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THE SOFTWARE REVOLUTION, PART 3



Besides being an awesome piece of programming in its own right, Microsoft's interactive debugger is a harbinger of the valuable tools programmers will soon have in abundance.

We've been discussing, for the last three issues, a number of things that have been revolutionizing the science, art, and craft of PC programming.

One of the big changes, as I've discussed, is the huge shift to C as the hard-core professional's programming language of choice. Another has been the growth of programming environments—led by Borland's Turbo Pascal, furthered by the likes of Microsoft's QuickBASIC and Borland's Turbo PROLOG (both big advances over the original standard set by Turbo Pascal). These hot programming environments integrate the creation (coding), syntax checking (compiling), and operational checking (running) of programs into one smoothly integrated tool.

Obviously we're soon going to see the synthesis of these two separate trends in the form of a Quick-C from Microsoft or a Turbo C from Borland. I'm sure we'll see it soon, if it hasn't already appeared by the time you read this. It's likely that we'll see a battle royal between these two giants of PC programming languages in the contest for dominance in everyman's C. Each of the two brings some special advantage over the other, and it'll be interesting to see who wins.

DEBUGGING ADVANCES Our topic for today is another facet of the broad programming revolution: the big advances that have been made in debugging tools, symbolized best by Microsoft's ultrapowered debugger, CodeView.

CodeView is the latest in a broad category of debugging tools that we might call symbolic debuggers. (In fact, CodeView's predecessor was called SymDeb. Apparently CodeView got its dreadful name—which echoes *TopView*, another dreadful name—by order of Jon Shirley, the suit-and-tie man at Microsoft who balances Bill Gates's wild talent. More evidence that you should never let an executive near that sort of decision.)

In general, a debugger lets you control and trace the operation of a program so that you can see what's going on with it. How powerful and useful a debugger is depends on how many bells and whistles it contains (it also depends, of course, on how nifty and convenient the implementation of those bells and whistles is to use).

DEBUGGER POWER The power of a debugger really depends on how smart it is—on how much information the tool is able to get hold of and make effective use of. Generally, debuggers work at one of three levels.



At the lowest level, we find the DEBUG program that comes included with DOS (which most of us know well and don't love at all), which is the simplest kind of debugger. DEBUG allows you to step through a program instruction by instruction or set breakpoints where the program will pause, but it doesn't know anything about what's in the program's code or data. DEBUG doesn't have any smarts about where we ought to put breakpoints in the program or where and what the program's data is. And DEBUG can't show us anything besides the machine's registers and raw memory contents (in hex or assembly pseudo-code; but not, for example, interpreted into data that is meaningful to the programmer).

SMARTER LEVELS The next smarter level of debugging tool—such as SymDeb and its competitors—can do more for programmers because it can grab onto two kinds of information, the kind made available by the compiler and by the linker. This information includes the kind of thing that programmers are used to seeing if they have the link editor produce a "map." The map shows the relative memory locations of all the program's public symbols that are used in linking; that includes all the entry points to program routines and the location of each piece of data that's declared "public."

That much information lets a debugger act a little smarter. The most important

Illustration: Cary Henrie

■ PETER NORTON

goody that this level of debugging provides is code line numbers. Compilers can (and today most do) spit out extra information in the program code they generate that marks the places in the code that correspond to the beginning of each line of the programmer's source code.

This information, together with some fancy footwork on the part of the debugging tool, allows the tracing of a program's execution to be synchronized, line by line, with the original program source code. That's really the most important advance in debugging tools, because, except for assembly language fanatics, debugging that isn't matched with the programmer's language source code (in Pascal, C, or whatever) is basically useless.

Since today's standard-issue compilers can spit out the necessary information, today's standard-issue debugging tools can pretty much handle it. But Microsoft has taken an important step further with CodeView.

THE NEXT STEP This next step is to have the compiler spit out complete information on both the type and location of every piece of data that the program uses. With that enriched information, the debugging tool can not only trace through the program code (and know where it is, line by line) but it can also keep track of the data—finding it and interpreting it intelligently. No more looking at your 4-byte integers in hex: you'll see 'em as integers, or strings, or whatever.

Now personally I have never been a big fan of debugging tools in general. I've always believed that high-level language programs could be debugged very effectively and efficiently in the high-level language itself. Conscientious debugging work—which mostly meant studying the source code closely and thoughtfully—just about did it all, and when it didn't, inserting some ad hoc tracing and testing code would take care of things. That certainly has been my experience.

But the more complex the program task or the less structured the programming methods, the more my kind of debugging shows its limits. And besides, everyone has his own working style; just because the tracing and probing approach isn't for me doesn't mean that it isn't the right tool for lots of other good programmers.

POWER HAS ITS PRICE Everything has a price, and the price of the extraordinary power of CodeView is that it works its heavy magic only with compilers adapted for it. Currently only Version 4 of Microsoft C is CodeView-compatible, but others, including FORTRAN and BASIC, are surely on the way.

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The real value of a debugger like Microsoft's CodeView lies both in its features and in how slickly and conveniently they are implemented. A couple of examples will give you an idea of just how amazing it is.

With the program source code on the screen, you can point to a critical line of code and have the program executed right up to that line. If while you're tracing through one program (and looking at its source code), control jumps off to another routine, CodeView will automatically fetch the subroutine's source code to have it on-line for you. If you want to check for some variable going to zero or running over a limit or any other logical test like that, you can tell CodeView what you're interested in monitoring, and it will run the program while constantly checking for the critical events and data you've asked it to watch.

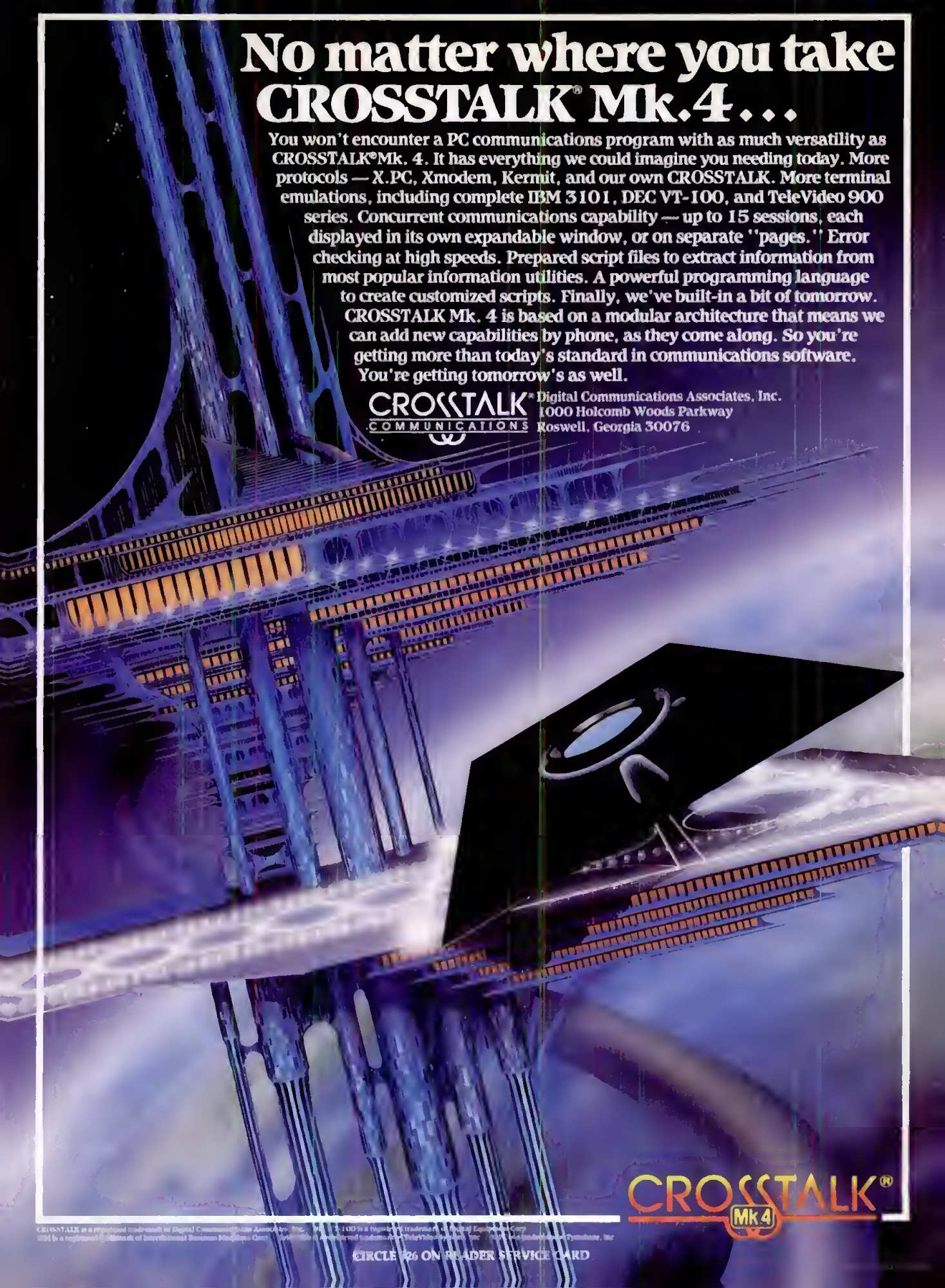
ALTOGETHER AMAZING Besides all that, it's got more windows and panels than anyone knows what to do with: you can tum separate panels on or off to watch registers, watch the stack, watch darn near anything you want—or not watch it if you have no use for it.

Altogether, it's amazing.

It also adds yet another strong incentive for heavy-duty PC programmers to switch to C. Microsoft built this wonder toy for the benefit of its own programmers, and having it at your disposal means that you're armed with a gun just as big as the big guys have.

Developments like CodeView are wonderful advances in themselves, putting really powerful tools into the hands of the programming desperadoes who really need them. But the real significance of a program like CodeView is that it symbolizes a broad improvement in the nature of working environments on the PC. While CodeView itself is an amazing piece of programming work just to contemplate, and while it puts some very powerful features in the hands of drastically desperate debuggers, it also demonstrates the major new directions—in powerful features and paneled displays—that we're going to see in the best new software.

In short, CodeView is a sneak preview of the future. PC


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■ JIM SEYMOUR

WHERE ARE THE OTHER LOTUSES?



It takes more than getting there first to capture the market. Perhaps the next round of great PC programs will come from firms that don't yet exist.

One of the enigmas of the personal-computer business—and a popular topic when editors and columnists gather for milk and cookies—goes something like this: "Why isn't there a *1-2-3* of word processors, of database managers, or of presentation graphics?"

In other words, with all the management, marketing, and programming talent (to say nothing of the cash) floating around the PC software business these days, why haven't overwhelming leaders appeared in virtually all the categories of PC software—products that utterly dominate their categories, as *1-2-3* does spreadsheets?

To be sure, *dBASE* has a little of that cachet in database managers, and *Crosstalk XVI* may be as close to a standard as any program is in the fractured communications software market. But neither truly dominates its field like *1-2-3*, and after those two, the list gets very thin. The dominant word processor? The dominant graphics program? You're kidding.

I've thought about this a good deal, because it does seem odd that other vendors haven't been able to turn the trick the way Lotus has. Is *1-2-3* really that good, that unique?

ON THE CUSP The question is particularly relevant today, when we are on the cusp of the reinvention of the PC software business. The opportunities afforded by Advanced DOS and the 386 PCs mean that we're going to see not only a new generation of programs, but, I think, also a new generation of big winners in software publishing.

To be sure, today's twin powerhouses, Lotus and Microsoft, will bring a lot to the table in this new game: market standing, financial resources, programming resources, visions of where the market can go. Managing the development of a couple of megabytes of finished code isn't just a little tougher than developing a nice 192K-byte program: it's an order of magnitude tougher, a different kind of job.

Lotus and Microsoft have the resources to do that, and I expect both to be big winners in the post-8088 world.

But I'll be very surprised if, 5 years from now, when the 386-generation software and hardware have taken over and the 386 shakeout has begun, the Softsel Hot List looks much like it does today. Most of the next round of great PC programs, and great PC fortunes, are going to come from firms that don't exist yet—or that are so changed from their 1987 form as to be fundamentally different companies.



Illustration, Cary Henre

ABSENCE OF DOMINANCE So will we then see a single dominant program in each of several applications areas? Let's look at some of the reasons usually offered for the absence of *1-2-3*–type successes in other areas.

One argument for the dominance of certain software products is that they were present at the creation, and in the absence of anything else very good, they stood out by being at least OK. MicroPro's *WordStar* is the universal example, but the collapse of *WordStar* in the market over the past 2 years seems to me to end that argument once and for all.

Moreover, *Magic Wand* (which became *PeachText*) and Michael Shrayer's legendary *Electric Pencil* (which became a footnote in personal computer history) were also present at the creation and had their ardent followers—yet nothing much came of either product. Being early isn't enough.

Market stature is another common argument for the absence of other dominant products, but remember that when *1-2-3* appeared, *VisiCalc*, the program that invented the PC business, was already a runaway hit. Because the *VisiCalc* people were ignoring CP/M machines, Sorcim's *SuperCalc* (now produced by Computer Associates) was making hay, too. Lotus had to scratch and claw for standing against those two; *1-2-3* was far from an easy win for Lotus.

Being absolutely the very first of your type on the market is a variation on those ideas, but remember that when *1-2-3* appeared, *Context MBA* had been on the



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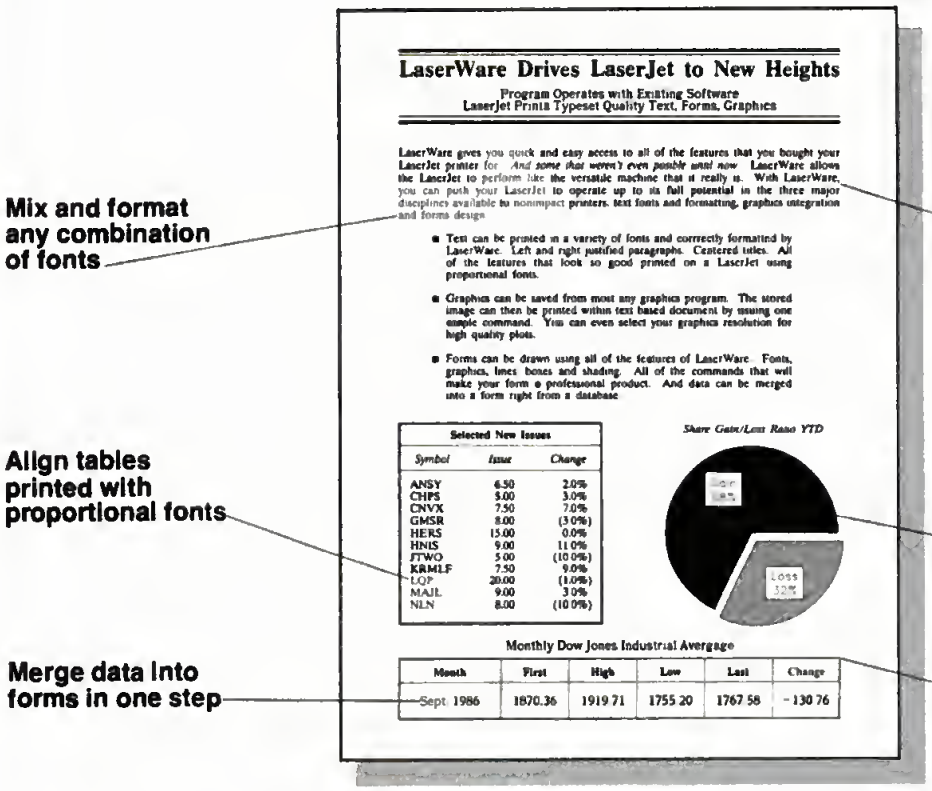
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Product Facts

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Rockland, DE 19732
(800) 237-9383
(302) 658-1123

Price: $99.95 include $5.00 shipping and handling

Requirements: 45Kb of RAM.DOS 2.0 or higher. HP LaserJet, LaserJet Plus printer. IBM PC or compatible.

■ JIM SEYMOUR

shelves for several months and, although painfully slow, was already winning high praise and big customers, such as United Technologies.

FORCES CHANGE I think that of all the answers to the "Why only *1-2-3*?" question, the best is Dan Bricklin's. The originator of *VisiCalc*, Bricklin argues that no product attains that kind of smash success unless it's so good that it absolutely *forces* users to change. Lotus's *1-2-3 was* that good; ergo, people changed.

And by extension, no product in the other categories is that much better than its competition. So we don't have comparably dominant word processors, graphics programs, and so forth.

I think that answer meets the test of reality. I like *Microsoft Word*, you like *WordPerfect*, someone else likes . . . the list is endless. But despite our preferences, would you argue that your word-processing program is so overwhelmingly superior that, upon seeing it, people know that they simply have to change? I wouldn't.

Back to the world of 386 software. Because many of us early 386 PC buyers will be eager to get our hands on something, *anything*, that really uses these machines,

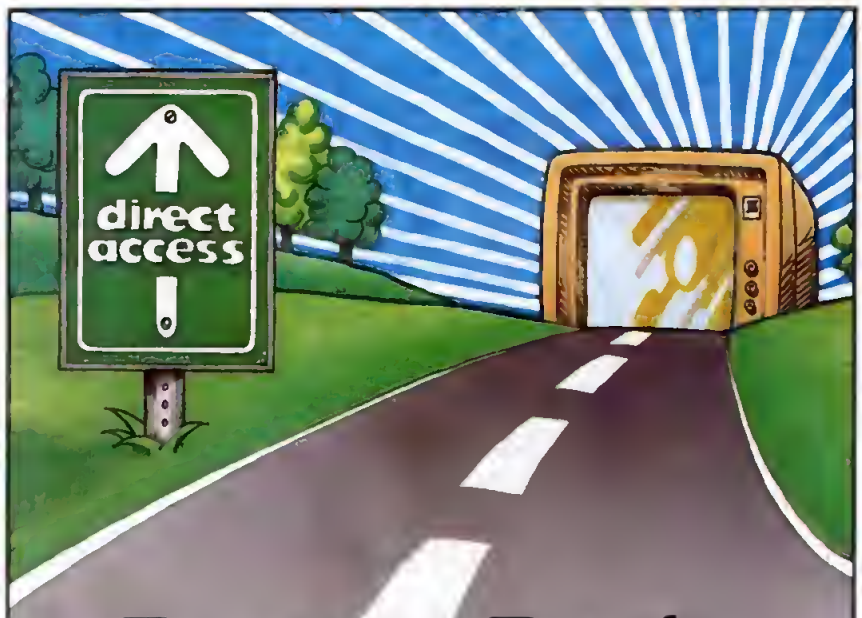
■ Would you argue that your word processor is so overwhelmingly superior that, upon seeing it, people know that they simply have to change? I wouldn't.

there'll be some early hits that won't show what Broadway calls "legs": the power of a worthy, long-running hit.

But the enduring successes in 386 software will demonstrate how right Bricklin is about dominant software: if you can bowl 'em over, you've got 'em. Anything else is strictly a show or place bet.

Unfortunately, while we'll see a lot of killer programs for 386 PCs, and some powerful new software shops will arise in the wake of the 8088 era, I doubt very much that we'll see singular, dominant 386 programs in each of several categories—any more than we do today.

The 386s will make it easier to create bigger, more powerful programs. But no easier to create *great* programs.



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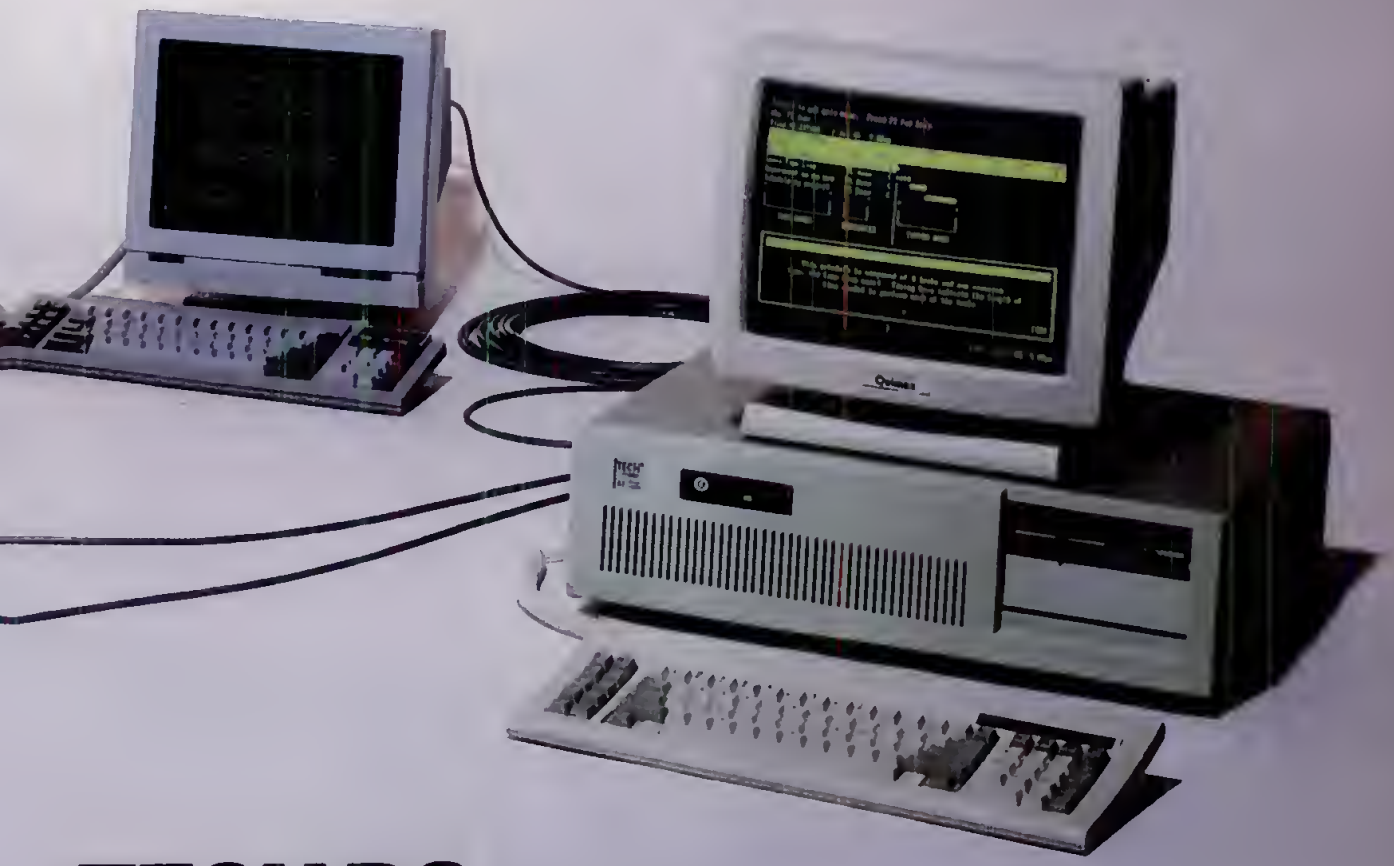
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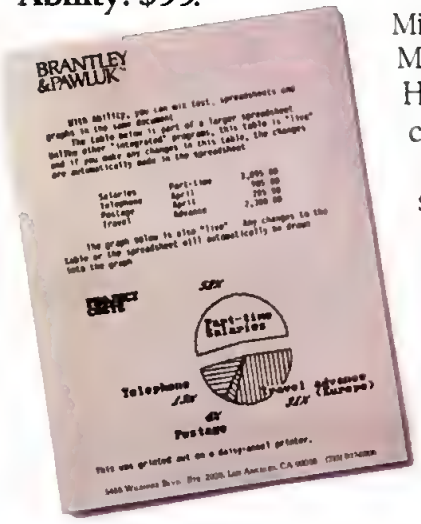
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■ STEPHEN MANES

THE OVEN OF THE HALF-BAKED IDEA



The PC's ability to carry out quick-and-dirty simulations is the real revelation of the personal computer revolution. For once, Steve Jobs is right . . .

All I wanted to do was find "Bowling for Dollars." But as I flipped through the channels in search of the acme of sports entertainment, a vaguely familiar visage stopped me cold at PBS. It was Steve Jobs in his charismatic-messiah posture—not for nothing did he have "software evangelists" on his Macintosh team—advancing the idea of simulation as the driving force behind his new Next Inc. machine.

Simulation? That old news? CAD/CAM, blah, blah, blah? Sure, Steve, and, zap, here come the keglers! Mrs. Mogolewski doesn't need a simulation to know her 7-10 split has just pushed the triple-bonus jackpot out of reach.

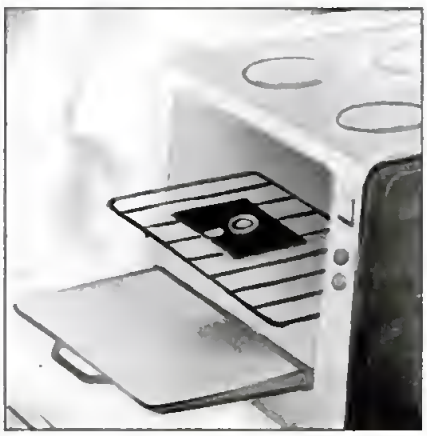
UNLIKELY NOOKS However, the commercial for an all-you-can-bivalve belly-buster at Mel's Mollusk Manse gave me a moment to contemplate. I suddenly saw simulation turning up in unlikely nooks and crannies of the PC universe. After all, in one rather fey sense, everything a PC does is simulation. Those dotty letters on the screen are really stand-ins for the fully formed ones you grew up with. Those low-res four-color graphs are simply surrogates for the ones your eighty-pen plotter will produce. Everything the machine does is ultimately the world cut down to RAM size.

At that level, granted, simulation isn't a terribly useful concept. But consider: the microcomputer's single greatest advantage is the power it gives the user to more or less easily mold a model of the final product that he or she really wants. The PC is the oven of the half-baked idea.

If there's one thing that separates the microcomputer from mainframes and minis, it's the idea that you can get the micro to do what you want, not somebody else's idea of what you want. If you don't like your mainframe software, you're out of luck unless you're responsible for hiring the guys who write and maintain the stuff. With a micro, all you do is shoot the disk and get another.

Calling the spreadsheet a simulation tool is a downright cliché, but it's a cliché that first arrived on the micro. With it, hotshot M.B.A.'s and plain-vanilla businessmen have developed incredibly complex business simulations. True, they may be based on utterly erroneous assumptions, and even when they aren't, they're far from absolutely accurate. But then, simulation is about likeness, not duplication.

The first time I realized the power of the half-baked idea was when I began fooling around with a copy of *Paradox*. The program makes it so easy to design forms and data structures, and so simple to revise them when you discover your first pass at the problem isn't close to what you really want, that I was able to put together a prototype database in a flash. The applications generator let me go most of the way toward putting together what I needed in the turnkey system I'd envisioned.



RAMIFICATIONS Then I thought about the ramifications. In the mainframe world, I would have had to write up a long list of specifications, and a programmer would have had to turn them into software. One reason mainframe software almost always turns out to be lousy—returning from Comdex, I nearly missed my plane when a new hire took 45 minutes to rewrite my ticket because she didn't remember some arcane codes—is that by the time the program is running, it's already too far along to be fixed.

But with a program like *Paradox*, the boss and his minions can fool around ad infinitum with alternative forms and data structures and can even solicit opinions from the lowly employees who might actually have to use the thing. The execs may not be able to design the whole system, but they'll probably be able to cobble together a pretty decent model of it. In essence, they can use these tools as simulators of the final program. Later, a real programmer can come in and smooth out the rough edges.

The simulation metaphor extends to all sorts of common PC practices. Take the

Illustration: Cary Henne

■ **STEPHEN MANES**

increasingly popular method that keyboard-trained managers have developed for generating letters, memos, and other forms of paperwork: they rough it out on their word processors, then hand it off to their secretaries for final cleanup and formatting. What the manager produces is really a simulation of the final draft.

The metaphor clicked in again recently when I saw a demonstration of Aldus Corp.'s *PageMaker* on a huge Conographics screen. The combination put two pages of text layout at your disposal, ready for you to grab the mouse and Mickey around. Fancy stuff, like kerning, seemed a bit tricky; obvious stuff, like fonts, was virtually child's play.

So now an art department can mock up a sample layout in no time at all, bring it in to the boss, and discover she had in mind something else entirely. In fact, the boss may do the early stuff herself. She may not know Helvetica from a pismo clam, but she can certainly use menus to pick the "sort of modern" typeface she envisions for the headline. The art folks will thus be saved from spending a fruitless week on the Old Style Goudy trail.

Simulation lets you see for yourself. A writer can try umpteen versions of the crucial sentence—and see them all in their purple glory in order to come up with the bon mot. A development tool like *Dan Bricklin's Demo Program* lets you fake software under development. Should that menu be red, white, and blue, or perhaps a restful shade of puce? You don't have to guess—you can see it right up there on the screen.

MICROCOMPUTER GENIUS The genius of the microcomputer is probably precisely this talent for simulation. You can see what something will look like, fool around with it, and play with it until you get it right. Though an awful lot of this fooling around is just that, it's nonetheless a powerful method and one that in the main simply did not exist a few years ago.

The kinds of educational simulations Jobs is talking about, though they may now seem something of a joke, will undoubtedly be taken for granted in another 10 years, when aging heart surgeons will be whining about how they lost their certification because they couldn't master *Cardiac Simulator*. We know what a picture is supposedly worth. What's the value of a flexible, malleable picture, be it of the great American novel, the inner workings of the femur, your company's finances, or the nozzle of a garden hose?

It's not fair. Steve Jobs is rich and good-looking. Why does he also have to be right—and almost as interesting as "Bowling for Dollars"? PC

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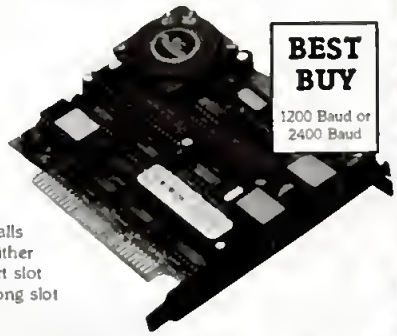
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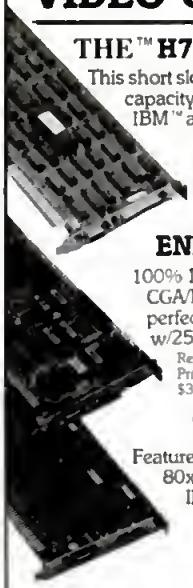
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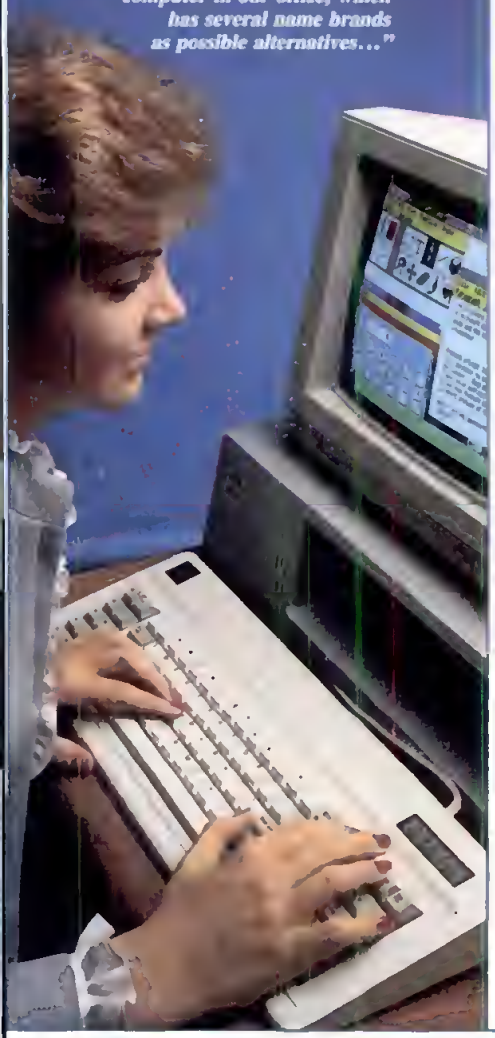
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■ STEWART ALSOP

AN EGGCITING WAY TO BUY SOFTWARE



From the wilds of the Pacific Northwest comes a software retail chain that really delivers. Egghead Discount Software puts some of the sizzle back into software selling.

They say that most retailing trends begin in California. This one began in Seattle, Washington. But it will revolutionize the selling of personal computer software just as Macy's or Wherehouse or other California retailers changed their industries. The revolution is happening with a chain of stores called Egghead Discount Software.

For those of you who don't live on the West Coast and aren't yet familiar with Egghead, the chain has grown from 3 stores in Seattle and Portland 2 years ago to 28 stores in those two cities plus Los Angeles, San Francisco, and Sacramento. By the time you read this, the chain will probably have opened up another 5 stores in the Chicago area and will be getting ready to open its first stores around New York City. By the end of the year, if everything goes according to plan, the chain will have exploded to 75 stores around the country.

What's so remarkable about Egghead? Somehow this chain has been able to figure out how to sell software—lots of software—without going out of business. That, in itself, is a new and revolutionary concept in an industry in which one scheme after another has been tried and has failed. The problem is that computer software is unlike any other product that has been distributed to consumers (either business buyers or individuals).

SOFTWARE IS DIFFERENT First, software is abstract, an amalgam of computer commands bunched together on a cheap little disk. Even simple software is so complicated that it takes a long time to figure out whether a particular program does what you want done. Books, records and tapes, videocassettes—all of these are easy to buy, since there are plenty of reliable ways to figure out what you like. But software—even if you read ten positively glowing reviews, get five personal references from people you really trust, and like the basic specifications—can always turn around and bite you in the neck 3 months after you buy it.

Second, software must coexist in the industry's distribution channels with hardware. And the plain fact is that hardware is more expensive and therefore inherently more interesting to a retailer and his salespeople, all of whom make their money off the margin. (In other words, 10 percent of $3,000 is a lot more interesting than 10 percent of $500.) So, except during a brief period when the industry first got rolling in 1981 and 1982, dealers that sell hardware have virtually ignored software, except for those few programs that help them sell the computer.



Third, software is literally all over the place. "Experts" estimate that more than 10,000 programs are for sale for the IBM PC alone. I don't know how these experts ever counted that many programs, but it's safe to say that any one computer owner has a wide range of choices when it comes to buying software.

Fourth, the capabilities of any software are closely linked to the capabilities of the hardware it runs on, and hardware technology has a nasty habit of improving rapidly. That means that an informed buyer (or seller, for that matter) must constantly engage in a continuing education program in order to keep up with not only the latest developments in technology but also with the compatibilities of those developments with preceding technologies.

MULTITUDINOUS METHODS People have tried a lot of different ways of selling personal computer software: via distributors, hardware dealers, software stores, hardware manufacturers, mass merchants like K Mart, book and record stores, the mail, the telephone, on-line services, catalogs, direct sales forces, even Tupperware-style parties. In fact, over the last 6 years, software has been sold in every manner conceivable, with mixed success.

Egghead has succeeded where many of those ventures failed, simply because it is better at retailing. Egghead operates on a principle that its chief executive, a guy named Victor Alhadeff, calls the "Five

Illustration: Cary Henne

■ **STEWART ALSOP**

Ss'': Site, Selection, Service, Savings, and Sizzle.

Site merely means that a store is convenient to the kind of people who buy software.

Selection means having a lot of titles: more than 1,500 per store. (Egghead currently stocks software in depth for the IBM PC, Apple II, and Commodore 64 and is now beginning to stock programs for the Commodore Amiga and the Atari ST.)

Service means training salespeople to know what they're selling; Egghead's sales staff do indeed know more about software than most retail salespeople I've encountered. Service also means being willing to make the customer happy. So, for instance, Egghead will open up any package in the store and let you use it and will let you return any package within 2 weeks for a full refund, no questions asked.

Savings, as Egghead's middle name suggests, means discounting prices from the suggested retail. While Egghead isn't the most aggressive discounter, the store's prices tend to be reasonable, and it frequently has specials that are a bargain.

Last but not least, Sizzle means giving the customer a good time. Kids are welcome. You don't have to wear a suit to get good service at Egghead. And the stores frequently have interesting promotions, often with reps from the vendors, celebrity programmers, or a guy dressed up in a Mr. Egghead costume.

■ Egghead operates on a principle it calls the ''Five Ss'': Site, Selection, Service, Savings, and Sizzle.

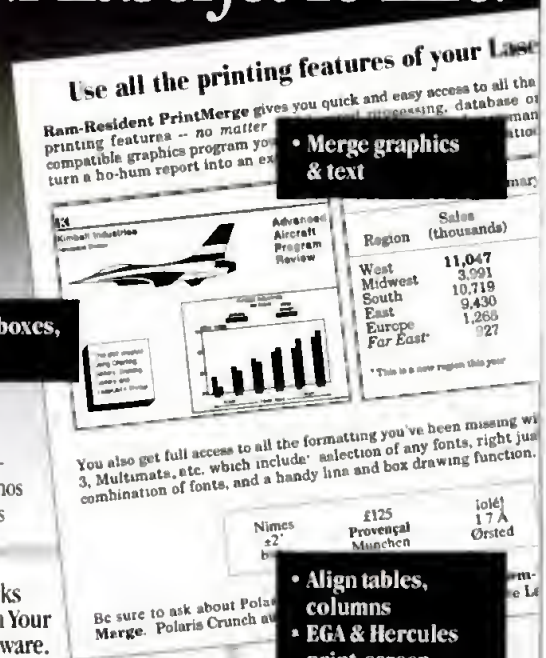
The real bottom line is that shopping at Egghead is always interesting and almost never disappointing. As long as Egghead doesn't blow itself up as it tries to expand rapidly across the country, I would be willing to bet that as many as half of you will find yourself visiting an Egghead Discount Software store on a regular basis within the next 3 years. (Or, for those of you who buy software for your company, you'll probably get a visit from Egghead, since the chain also maintains an outbound sales force, which accounts for as much as half of the software the chain sells.) In this crazy business, that would be no small accomplishment. PC

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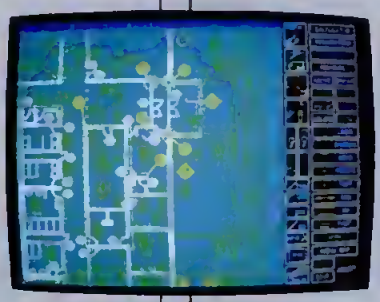
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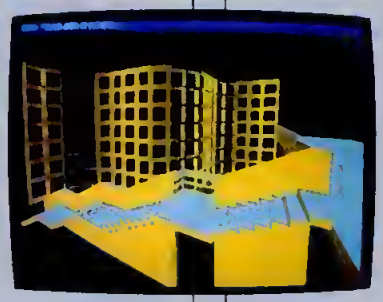
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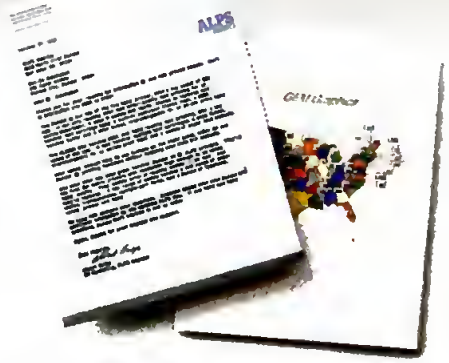
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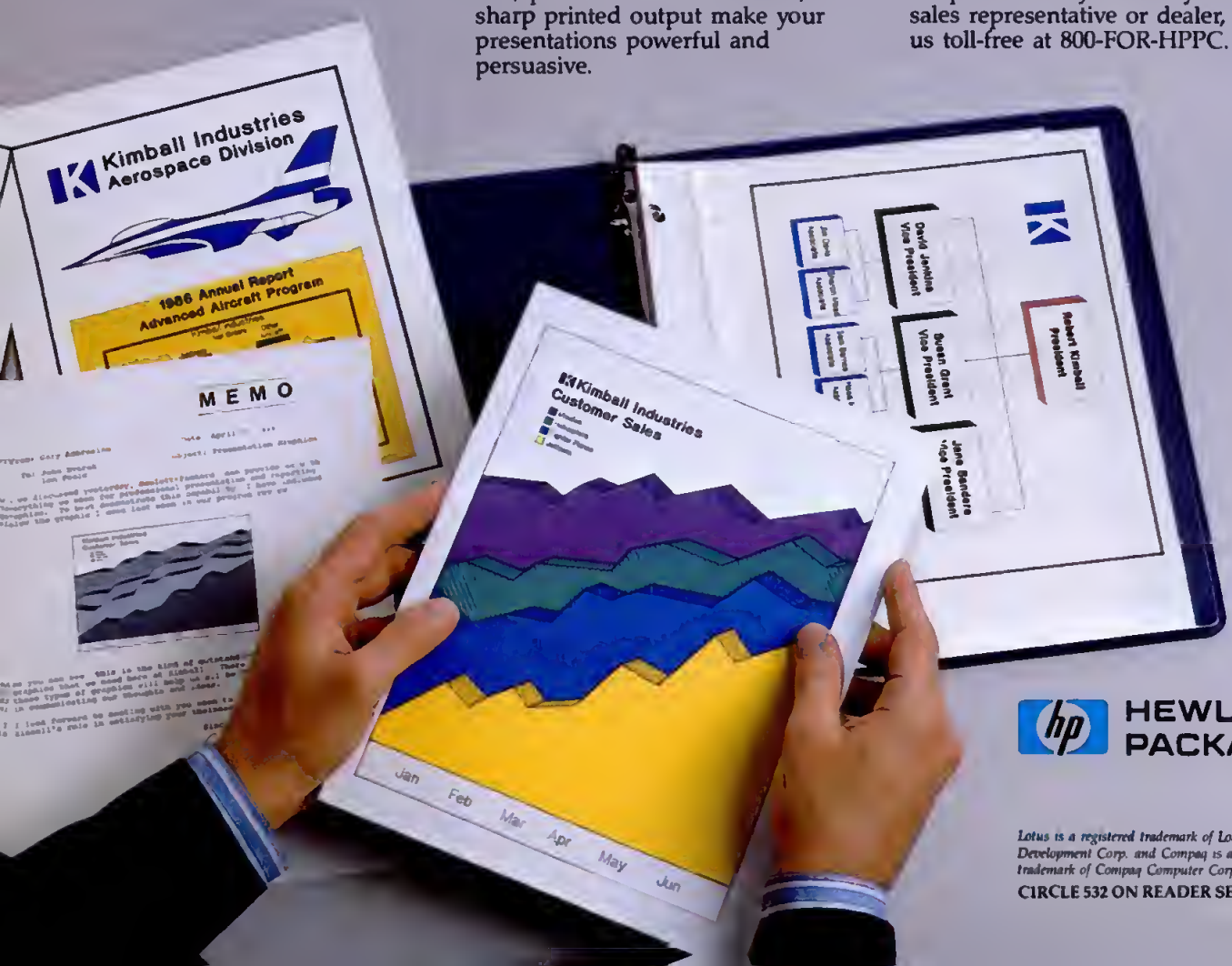
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HEWLETT PACKARD

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AND HERE COMES HAL



Four years ago, 1-2-3 was considered state-of-the-art software, but not now. Just in time, Lotus has released HAL, a super 1-2-3–interface add-on that brings new life to the old classic.

Newcomers to the PC may be surprised to learn that Lotus Development Corp.'s *1-2-3* was once considered an easy program to use. Its introduction early in 1983 seemed to herald a new breed of software. Never had so much power been packed into a user interface that fit the fingers so naturally.

It was amazing. The *1-2-3* menu used real words, and as you moved the cursor among the menu items, a one-line explanation in English described each command. With the cursor keys, you could visibly block out ranges of the spreadsheet. You could assign names to ranges and refer to them by name. Graphing was a snap. And if you ever got stuck, just pressing F1 brought up a context-sensitive help screen. The extensive on-line help information was unprecedented for personal computers.

But that was 4 years ago—nearly a generation in the computer industry—and one generation's user-friendly software is another generation's awkward hodgepodge of confusing cryptic commands.

Photograph: Roberto Braun

■ When running *HAL*, you can use *1-2-3* almost exactly as you do now. Pressing the Backslash key, however, brings up the *HAL* request box.

Maybe the reputation that *1-2-3* now has as a difficult program is a bum rap. Maybe not. Regardless, a new add-on program called *HAL* now offers an alternative interface to *1-2-3* that's got everybody talking. They're not talking to each other. They're talking to *HAL*.

EXTENDING THE POWER *HAL* is a program that runs in conjunction with *1-2-3*, Release 1A or 2. If you install *HAL* on a hard disk in the same subdirectory as *1-2-3*, you simply type

```
HAL
```

and the *HAL* program will load 123.EXE on top of itself in memory. You can also put the *HAL* files in a separate subdirectory or use the program from floppy disks. *HAL* is not copy protected and makes no physical changes to your existing *1-2-3* files.

HAL is a 110K-byte program, plus two overlay files that total 144K and a help file of 73K. *HAL* reduces maximum spreadsheet memory size by about 110K, and possibly more, depending upon the status of the undo feature. (I'll give you more details on this later on in the review.)

When running *HAL*, you can use *1-2-3* almost exactly as you do now. Pressing the Backslash key (\), however, brings up the *HAL* request box. You type *HAL* "requests" (commands) in this box. These *HAL* requests are unlike anything you've seen in *1-2-3*, and some of them are quite amazing. Above all, *HAL* is great fun. Even jaded *1-2-3* users will get some real kicks out of experimenting with this clever program and may even make it a permanent part of their *1-2-3* sessions. It's worth every penny of the $150 list price.



Pressing the Backslash (\) key brings up the HAL *"request box." This is where you enter* HAL *commands.*

HAL offers many useful features not found in the stock versions of *1-2-3*. These features include linking cells from other spreadsheets to the current spreadsheet, on-screen lists of formulas or highlighted dependent cells, a search and replace, easier entering of sequential data (including month names and days of the week), much simpler macros, a more extensive use of assumptions when executing complex commands, and an undo feature that reverses the most recent operation.

But there's a basic problem here. These extensions of *1-2-3*'s functionality demonstrate more than anything else the comparatively weak improvements of Release 2 over Release 1A. Spreadsheet linking, auditing, and the undo feature alone would have made upgrading to Release 2 an obvious necessity rather than a doubtful decision.

What's sad about this is that *HAL* is an add-on that works by hooking into the *1-2-3* program and tacking on these features. For this reason, the features must necessarily function less optimally than if they were actually built into *1-2-3*. This becomes more obvious as you look at these features.

BACK TO THE COMMAND LINE The most interesting aspect of *HAL*, however, is the way you enter commands. *HAL* is a command-line interface that provides an alternative to the normal *1-2-3* menu commands. With normal *1-2-3*, you can insert a column by typing /WIC (which stands for worksheet insert column) or by going through the menus selecting each of the words that make up this command. With *HAL*, you can insert a column by typing

```
Insert a column
```

in HAL's request box.

The resemblance of these commands to English has led some people to describe *HAL* as a natural-language interface for *1-2-3*.

Indeed, *HAL*'s vocabulary of about 675 words, its use of column and row headings to describe spreadsheet data, the assumptions it makes when doing graphs and database commands, and its ability to interpret such words as *this* and *it* rationally certainly make this command line nothing like the old-fashioned command lines still found in such programs as *dBASE II*, *XyWrite*, and DOS.

To both novice and experienced *1-2-3* users, *HAL*'s command line is impressive.

After you set up a simple two-dimensional spreadsheet, for instance, you simply type

```
Graph this
```

and *HAL* will carry out all the commands necessary to display a bar graph for the data.

Here are some other typical *HAL* commands [*Where a command was too long to typeset on one line, we indented the rest of the command on the next line. This indentation does* not *represent a carriage return.—Ed.*]

```
Enter Jan to Dec down
Sort this by lastname
Increase sales by 1Ø %
Sum income
Let profits = income -
  expenses
Project expenses 1Ø % across
Print all
```

Although these may appear magical, they follow a syntax common to all *HAL* requests. They begin with a verb and have optional location, qualifier, and destination fields, and they aren't case sensitive.

HAL duplicates most *1-2-3* functions through these commands, even to the point of absurdity. For instance, the command

```
Move up 1
```

moves the cursor up one position. Other commands cannot be so easily duplicated by simple existing *1-2-3* functions. For instance, *HAL* lets you capitalize, lowercase, or "propercase" (first letter capitalized) a series of labels. You can convert numeric labels to numbers or vice versa.

MAKING ASSUMPTIONS To interpret Englishlike commands correctly, *HAL* has to make certain assumptions. First, *HAL* defines a new concept, called a "table," that is not the same thing as a table in normal *1-2-3*. According to the *HAL* manual, "A table is a rectangular area of the spreadsheet that contains data; it is bordered by two blank rows or columns or by the spreadsheet border."

In *HAL* commands, the word *this* by itself refers to the table in which the cursor is currently positioned, but you can also use phrases such as *this column* and *this row*. If the table has column and row labels on the top and left, *HAL* will also let you use these labels as names for the columns and rows. Or you can use the normal *1-2-3* range notation within *HAL* commands.

You can type in multiple requests on one line separated by a period or the words *and, then,* or *and then*. If you use the word *it, HAL* assumes that you're referring to the last location you explicitly specified.

In many cases, *HAL* implicitly translates requests into a series of *1-2-3* menu commands. The F6 key can display the sequence of *1-2-3* menu commands necessary to carry out the *HAL* request.

HAL has its own context-sensitive help screens. They are organized differently from the normal *1-2-3* help screens, and they can be edited, so you can add your own information to *HAL*'s help.

You can keep the *HAL* request box up permanently if you want, with some restrictions: Although you can still use regular slash (/) commands and can also enter numbers in the spreadsheet, you cannot enter labels unless you explicitly precede them with a label prefix or enter them by pressing Ins. That's the only way *HAL* can tell that you're not trying to enter a request. Nor can you use the cursor-movement keys as a combined Enter and move cursor. You must press either Enter or Ins.

GRAPHS AND DATABASES The *1-2-3* Graph and Data options are probably the two most difficult areas in the *1-2-3* menus. Once you've mastered these, the only thing left is macros.

By making some basic assumptions, *HAL* enormously simplifies the first steps in working with graphs and databases. Yet it does not fully implement all the options on the *1-2-3* menus.

For instance, you can specify the type of graph (bar, pie, and so on), the first and second lines of titles, and the *x*-axis and *y*-axis titles, but you can't select legends, data labels, formats, grids, scales, color, and so forth. Obviously we're dealing with lots of options for which command lines would be just too complex, for which the *1-2-3* menus are better, and for which *Microsoft Windows*–like dialog boxes would be ideal.

As you might expect, *HAL* commands to sort databases are also very nice.

```
Sort this by department then
  by lastname
```

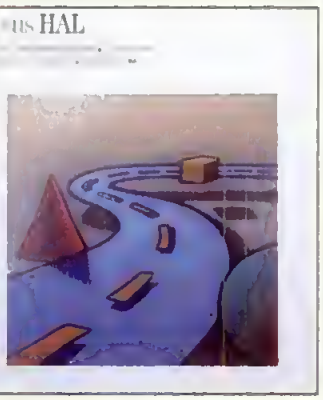
Extracting records is improved immensely. *1-2-3* normally requires that you set up some cells to serve as a criterion. In *HAL*, it's done in the command line

```
Match department =
  marketing
```

HAL does not, however, duplicate *1-2-3*'s Data Table facility.

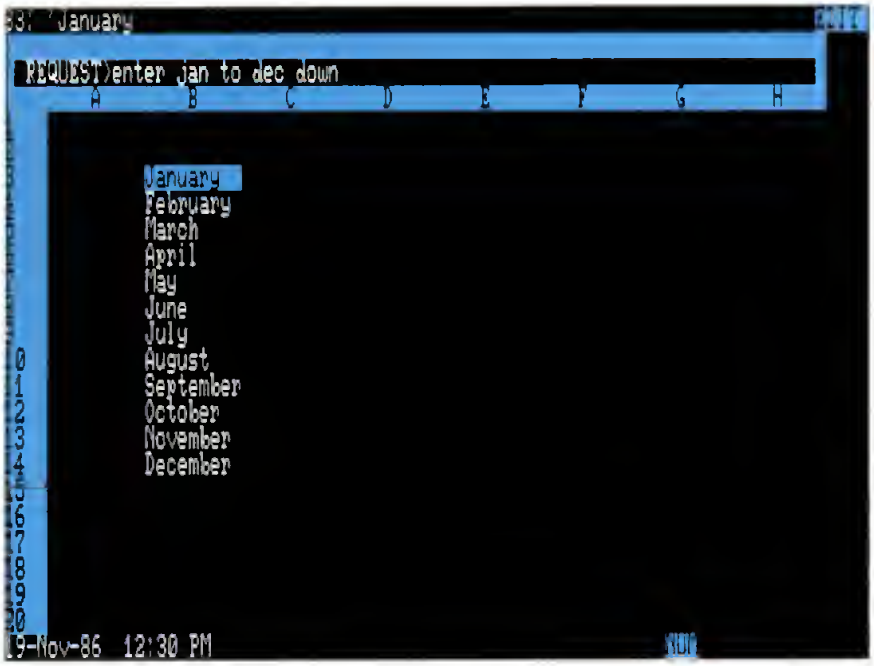
MORE AND BETTER MACROS What would *1-2-3* be without macros? Don't worry—*HAL* supports regular *1-2-3* macros and then some. You can create macros using a mix of both normal *1-2-3* macro notation and *HAL* request notation. The only real restriction is that you can't mix normal *1-2-3* and *HAL* commands on the

PC MAGAZINE FACT FILE



HAL
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
(617) 577-8500
List Price: $150
Requires: 512K RAM, *1-2-3* (Release 1A, 2, or 2.01), DOS 2.0 or later.
In Short: *HAL* adds several valuable features to *1-2-3* and simplifies some complex tasks through a command-line interface. However, since *HAL* is an add-on product, these new features are not fully integrated with the rest of *1-2-3*. The command-line interface bears some resemblance to natural language. Not copy protected.

CIRCLE 681 ON READER SERVICE CARD



HAL *recognizes the words* Jan *and* Dec *as months and fills in unabbreviated month names starting from the cursor position.*

same line. In addition, the lines containing *HAL* commands can't even contain certain characters (such as curly braces) that might confuse *HAL* into thinking it was actually a *1-2-3* command line.

HAL also makes use of several commands designed specifically for macros. With *HAL* commands, macros start looking like a real programming language instead of gibberish. You have replaceable parameters (much like DOS batch-file parameters), if-then statements, messages, and user responses.

HAL commands that you've entered in a session can be recalled. You can then enter them again or insert them into cells. This is an easy way to experiment with a certain series of *HAL* commands that you then use to make a macro. Alternatively, you can save a series of *HAL* commands to a transcript file with the .PRN extension. You can then import that file into your spreadsheet.

LINKING YOUR SPREADSHEETS

Now that we've seen some of *HAL*'s spiffier outfits, it's time to open the hamper and take a look at the dirty laundry.

I mentioned earlier that many of *HAL*'s features should have been built into *1-2-3*, Release 2. Their inclusion in an add-on product is a frustratingly inadequate compensation. Nothing demonstrates this more than spreadsheet linking.

The inability of *1-2-3* to link cells between different spreadsheets is one of its biggest deficiencies. Because of this deficiency, *1-2-3* users are forced to create enormous spreadsheets rather than split their work up into several smaller modular files. (In this respect, *1-2-3* is almost like a programming language without any subroutines.)

This is such a problem that an entire bank-switched memory scheme (the Lotus/Intel/Microsoft expanded memory specification) had to be created specifically to give *1-2-3* users more memory for these huge and complex spreadsheets.

Ostensibly, *HAL* solves the problem. With *HAL* you can enter a request that looks like this

```
Link this cell to H11 in
  SALES87
```

and the value of cell H11 in SALES87.WKS will be moved into the cell in the current spreadsheet where the cursor is positioned.

But if you then look up at the *1-2-3* control panel, you'll see that the cell contains only the value from the other spreadsheet and no indication that the cell is linked. The only way to display the links currently established in the spreadsheet is with the command

```
Show links
```

This command is one of the few for which *HAL* asks for a confirmation before it carries out the command. It has to insert text in your spreadsheet that tells you the location of all the links. By default, it will place these labels a few lines below the current table. You may have another table down there, so *HAL* warns you about that possibility (though not in so many words) before it writes over the data. It does not know for sure if it's going to write over data. That's for you to figure out. If it's a problem, you have to cancel the command and reenter it with an explicit destination.

This is the only way to determine where the links are. Nothing in the linked cell itself does that. You can enter another number in the cell, and the spreadsheet will be recalculated based on that new number. Now save the spreadsheet and reload it. At first, the number you manually entered appears, with the rest of the spreadsheet looking just as you saved it. But "WAIT" is still blinking. Suddenly the cell changes to the linked value, and the spreadsheet recalculates.

What's going on here? The manual confirms what any experienced *1-2-3* user can figure out—*HAL* is using *1-2-3*'s existing File Combine facility to do the link-

■ The manual confirms what any experienced *1-2-3* user can figure out—*HAL* is using *1-2-3*'s existing File Combine facility to do the spreadsheet linking.

THE BEST OF HAL

1-2-3 users will love HAL because it simplifies repetitive spreadsheet set-up chores.

I suspect that some of *HAL*'s biggest fans will be veteran users of *1-2-3*, if only for the thrill of seeing an old friend with a brand-new face. *HAL*'s best features for the *1-2-3* user are those that simplify some of the repetitive chores involved in setting up a spreadsheet.

For instance, typing in just

```
Enter Jan to Dec down
```

and

```
Enter 1987 to 1991 across
```

sets up row and column labels for the next 5 years. Of course, the second command can be done with the /Data Fill command from the *1-2-3* menu, but it's not nearly as much fun.

HAL assumes that the column headings and row labels refer to the columns and rows. So once you type in the January 1987 sales figure (for instance), you may want to project the sales figures for the rest of the year. You can do it with simply

```
Project Jan down by 5%
```

To get the total for 1987, the command is just

```
Total 1987
```

HAL also excels in making assumptions about range definitions. Everyone gets annoyed at the beep that *1-2-3* emits when you select the Go from the Print menu without first selecting the range to be printed. *HAL* doesn't require that range, so the command becomes

```
Print this
```

for printing the current table or

```
Print all
```

for printing the whole spreadsheet.

The range assumptions *HAL* makes are even more timesaving when it comes to Graph and Data options. Nothing quite beats

```
Graph this
```

or

```
Sort this by lastname
```

While graphing and sorting using the normal *1-2-3* menus are not difficult jobs, defining the necessary ranges is often time-consuming.

Database extraction is one of the messiest jobs you can do in *1-2-3*. If you don't do it often, you almost have to check the manual or the help screens for instructions. *HAL* lets you do it with a simple

```
List employees whose
  salary < 25000
```

For the *1-2-3* macro hacker, *HAL* adds a whole new dimension to creating and executing macros. In some respects, *1-2-3* macros are almost as powerful as a programming language. In comparison with other programming languages, however, the readability of *1-2-3* macros falls somewhere between APL and hexadecimal machine code.

With *HAL*, you can create macros that are more powerful than existing *1-2-3* macros and genuinely readable. You get things like replaceable parameters, if-then statements, messages, and responses. Instead of writing down your keystrokes and reentering them in a macro definition, *HAL* provides a facility to log a series of *HAL* commands and then insert it into the spreadsheet.

—Charles Petzold

ing. It does this only when the link is first specified and when the spreadsheet is loaded from disk. If you were skilled in *1-2-3* macros, you could do something like this yourself with the \0 (auto-execute) macro.

In other words, *HAL*'s spreadsheet-linking capability is simply a kludge. It is necessary because *HAL* is an add-on. This is not the file-linking capability that should have been implemented in *1-2-3*, Release 2, to begin with. In a properly designed spreadsheet-linking scheme, both the filename and range name of the linked spreadsheet would be specified right in the cell formula.

Spreadsheet linking in *1-2-3* is still a problem, even with *HAL*'s assistance.

UNDOING ERRORS If you press the Backspace key when the cursor is on the first position within the *HAL* request box, the spreadsheet reverts back to the state before the previous *HAL* command or regular *1-2-3* command. This is *HAL*'s undo feature.

The first time I used undo was after I positioned the cursor on a cell I wanted to delete and typed

```
Delete this
```

The word *this* if you remember, refers to the entire table. (I should have typed "Delete this cell.") After I picked myself off the floor and pressed the Backspace key, I got everything back.

An Undo feature is now considered de rigueur in large applications programs. *HAL*'s undo is a rotating undo (that is, a second undo goes back to the spreadsheet as it existed before the first undo) and is particularly handy in a spreadsheet program. For instance, if you enter

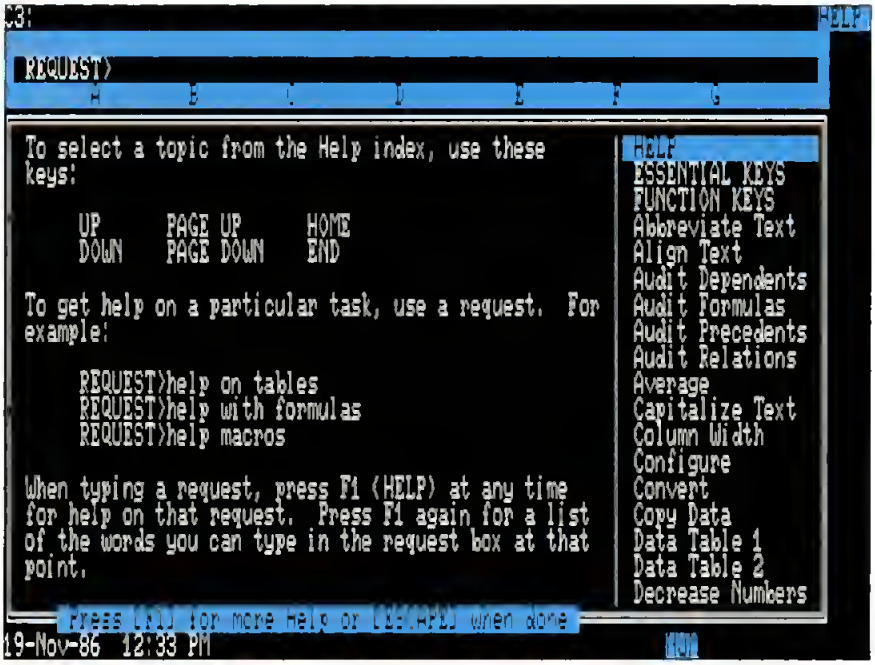
```
Increase sales by 10%
```

you can flip back and forth between the no-increase spreadsheet and the 10 percent–increase spreadsheet just by pressing the Backspace key.

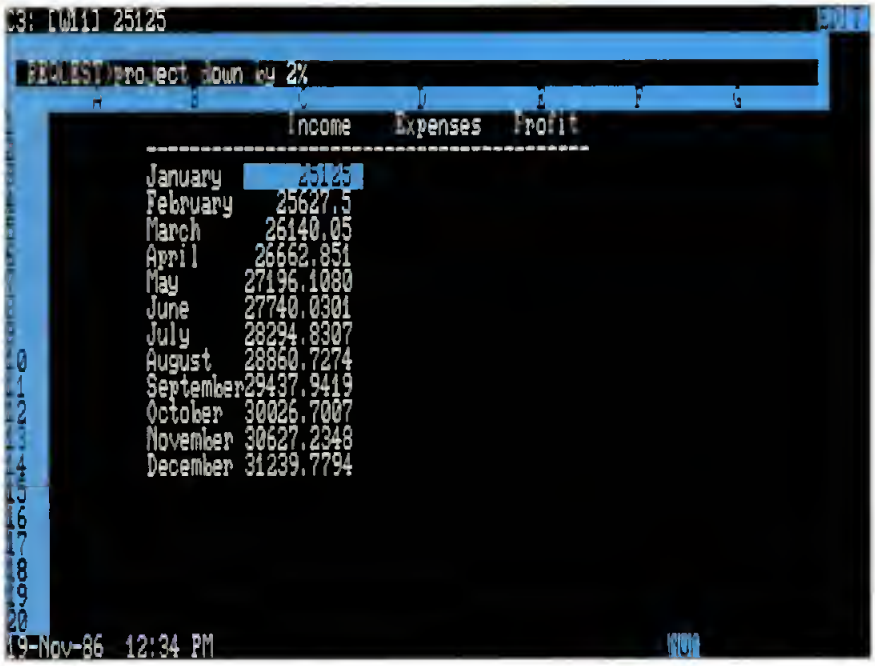
You can even get more complex with a what-if study by using macros. If you undo after a macro has been executed, the spreadsheet will revert to its condition before the entire macro. Very nice.

However, the Backspace key is a particularly bad choice for an undo key. If you use the backspace for backspacing and erasing *HAL* commands, one backspace too many will perform an undo. You may not even notice when that happens. The undo key should not be an easy key because in a properly designed program, undos should not often be necessary. *HAL* is the first program I've seen that makes an undo essential.

The memory requirements for undo are somewhat complex. *HAL* must continual-



Pressing the F1 key while the HAL *request box is on the screen brings up the help screen. The topics are listed at the right of the display.*



One of HAL*'s best features involves the use of commands such as Project, which fills a row or column with numbers.*

ly retain a full copy of the previous version of the spreadsheet plus some status information (about 30K bytes for Release 1A and 47K for Release 2). If you use *1-2-3*, Release 1A, and have an expanded memory board, *HAL* will use expanded memory for storing the previous spreadsheet version. So (assuming you have enough expanded memory) your maximum spreadsheet size is reduced only by the size of the resident *HAL* program, which is 110K bytes. If you don't have an expanded memory board, your available spreadsheet size is less than half that value. You may turn undo off if you need the space.

■ As with spreadsheet linking, *HAL*'s undo feature reminds us of *1-2-3*'s deficiencies in this area and only goes part of the way in correcting them.

As with spreadsheet linking, *HAL*'s undo feature reminds us of *1-2-3*'s deficiencies in this area and only goes part of the way in correcting them.

Perhaps the most frequent form of accidental spreadsheet loss in *1-2-3* is a /QY (Quit) without first saving the file. As everyone has said for years, *1-2-3* should have a confirmed quit, and it should have been added to Release 2.

Yes, I am well aware that the Y typed after the /Q is a confirmation to quit. However, since *1-2-3* requires this confirmation even if no changes have been made to the spreadsheet since the last save, it has become part of the normal command to quit *1-2-3*. Ask any *1-2-3* user for the command to quit and the answer will be "Slash Q Y." The confirmation should only appear if the spreadsheet has been changed since it was last saved. It should be a surprise. That way, nobody would get accustomed to hitting Y without thinking about the possible ramifications first.

Obviously *HAL* cannot do anything about a /QY. That's beyond what you can expect from an add-on product. *HAL* will, however, restore the original spreadsheet following a /FR (File Retrieve). This is probably the second most common cause of accidental spreadsheet loss.



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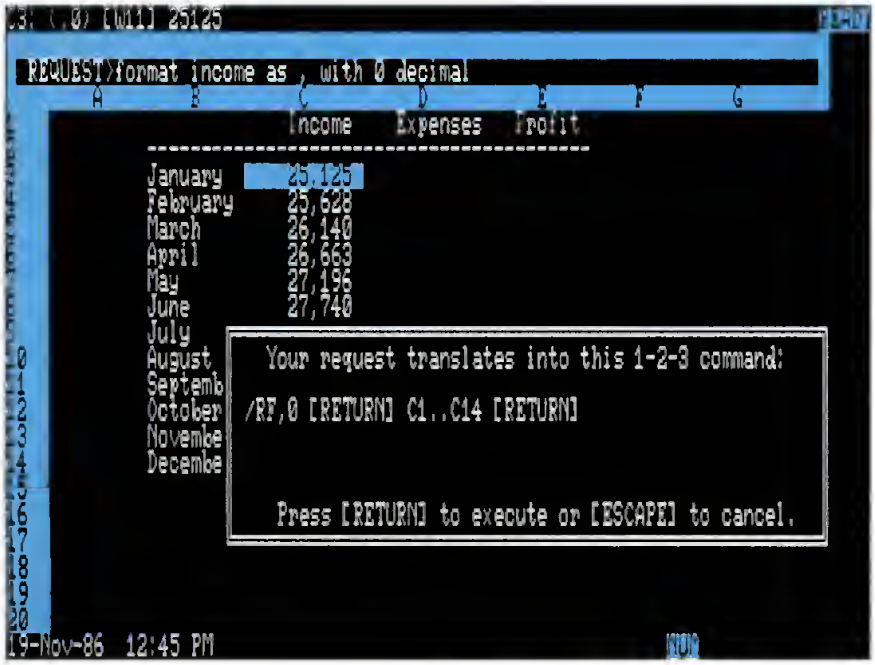
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CIRCLE 133 ON READER SERVICE CARD



In many cases, you can use the F6 key to see how HAL *is translating your request into* 1-2-3 *commands. In this case, the command is to format a column of numbers.*

WHAT'S WRONG WITH ENGLISH? Is *HAL* really a natural-language interface for *1-2-3*? Is it useful? Will it revolutionize the computer industry? Are menus dead? My answers are: Not really. Often. Give me a break. No way.

HAL's command-line interface almost never talks back to you. While that may sound like a desirable trait, in computer software it is intolerable. Even the primitive command-line interface of DOS tells you important things such as "File not found" and "Invalid parameter."

In contrast, *HAL*'s error processing is as crude as *1-2-3*'s. If you type a command line it cannot understand, *HAL* simply beeps and positions the cursor in the approximate vicinity of the error. You can press F1 to get a help screen (based on the first word of the command), but that's it.

HAL comes with a 250-page manual. It is as important to read this manual as it is to read the *1-2-3* manual. All the commands are described as rigidly as the syntax of any command-line interface. If you just try to go it alone under the assumption that *HAL* will understand your language, you will end up typing command after command, getting beeped at, trying to figure out what's wrong, and getting no work done.

Considering that Lotus wrote the book on easy-to-use menus with *1-2-3*, this command-line interface is certainly an odd feature. One of the primary benefits of a menu interface is that almost everything you can possibly do with the program is somewhere in those menus. All you have to do is find it, and if the menu is organized in an intelligent way, then that is pretty simple. (I'm not claiming that *1-2-3*'s menu is optimized to find things. Often some menu commands are very obscure and hidden behind the catch-all menu selection called "Options.")

A command-line interface, however, has almost infinite possibilities, most of which come under the category of "syntax errors." That's when *HAL* beeps at you.

AVOIDING THE TEMPTATION The value of *HAL* is that it provides *1-2-3* users with certain valuable shortcuts in setting up and experimenting with *1-2-3* spreadsheets. Period.

HAL does *not* provide an easy path for beginners to master the intricacies of *1-2-3*. It does *not* make *1-2-3* accessible to persons whose training and background currently renders them unqualified to use *1-2-3* without *HAL*. It does not—to be blunt about it—make *1-2-3* easy enough for secretaries to use. (And if your secretaries are currently using *1-2-3*, it is time to give them a promotion.)

■ One of the most dangerous things you can have around the office is a computer program that seems to be smarter than it actually is, and this is what *HAL* is.

If you read the *HAL* manual, you will discover that Lotus makes no such extravagant claims about *HAL*. Yet *HAL*'s natural-language interface is undoubtedly a temptation to believe otherwise. The name of this program (referring, of course, to the computer in *2001* that was so much like a person that it suffered a nervous breakdown) certainly doesn't help the situation.

This is potentially a serious problem. Every day, crucial business decisions are made based on the results of *1-2-3* spreadsheets. As anyone involved in heavy corporate use of *1-2-3* is aware, often these spreadsheets are not properly checked by experienced *1-2-3* users.

I contend that the deception introduced by a natural-language interface will require increased diligence on the part of managers where *HAL* is being used. I see nothing in *HAL* that would safely allow a person less experienced in *1-2-3* to competently create accurate *1-2-3* spreadsheets.

One of the most dangerous things you can have around the office is a computer program that seems to be smarter than it actually is, and this is exactly what *HAL* is.

Here is a simple example using a typical what-if scenario:

You have a spreadsheet set up that illustrates some sales, expenses, profits, and other data for your company. You want to see what these figures would look like if sales were increased by 5 pecent. This is a

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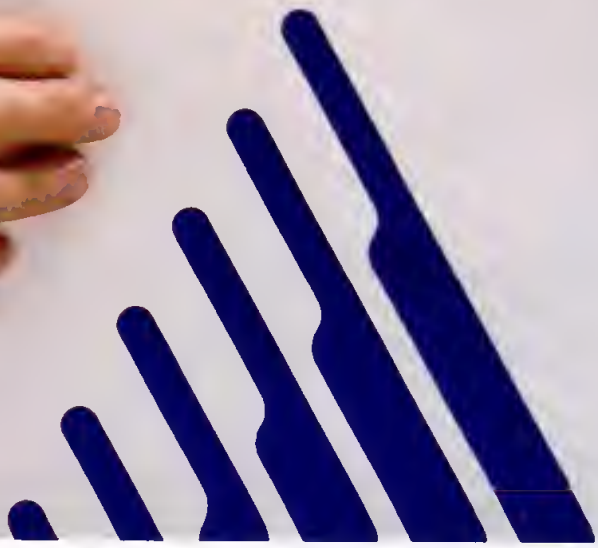
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CIRCLE 208 ON READER SERVICE CARD

■ The *HAL* instructions certainly look like natural language, but they're not. They are merely simple and straightforward commands.

simple *HAL* command

```
Increase sales by 5%
```

Now let's see what happens if you increase sales by 10 percent. Once again, it's a simple *HAL* command. Just type

```
Increase sales by 10%
```

OK, what are you looking at now? You're looking at a spreadsheet in which sales have been increased by 15½ percent over the original numbers.

To someone who has some experience with *1-2-3*, this is obvious. You know that *HAL* is interpreting these commands by merely multiplying all the numbers in the sales column by a constant, and if it does it twice, the results have been multiplied by two constants. As a *1-2-3* user, you know this because *HAL* is not doing anything you could not have done yourself. Obviously, *1-2-3* does not retain some kind of original sales figures unless you explicitly set up one column for actual sales and another column for projected sales.

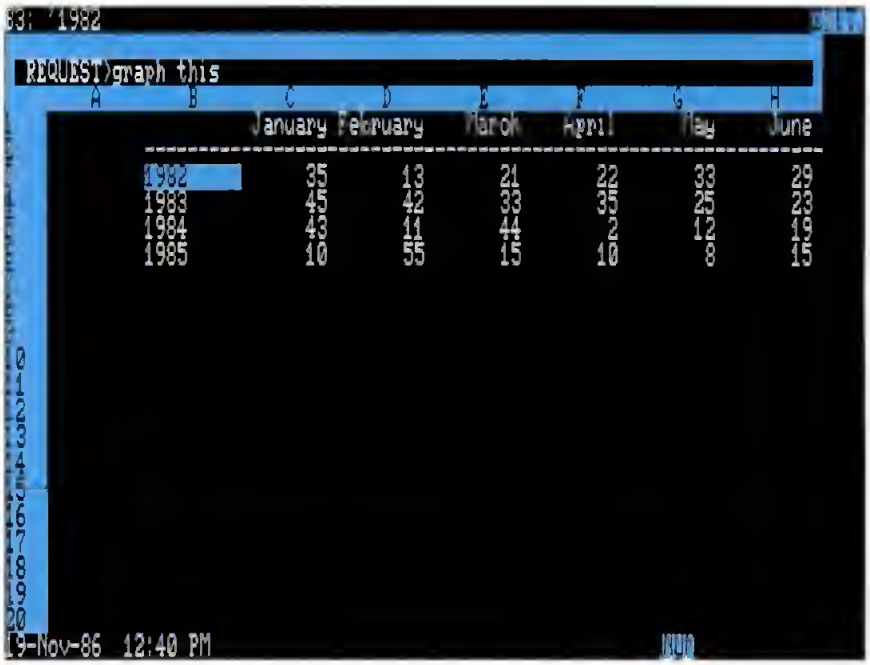
HAL is *not* interpreting these two instructions the way a research analyst would understand the same sentences when spoken by a boss. The *HAL* instructions certainly look like natural language, but they're not. They are merely simple and straightforward commands.

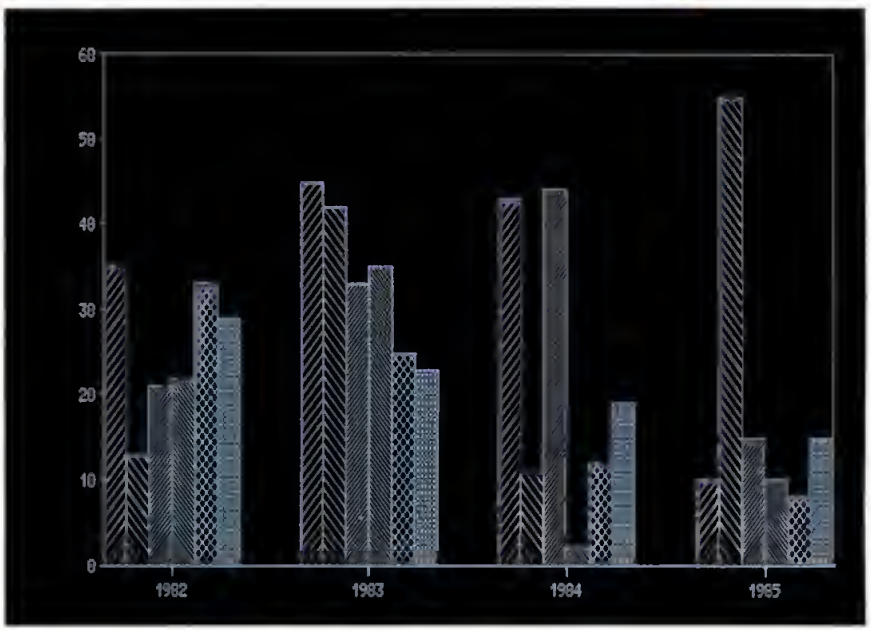
Back to the example. What you should have done before entering the second command was to get everything back to normal. You could do this with

```
Decrease sales by 5%
```

for instance. Well, not really. Increasing by 5 percent multiplies the numbers by 1.05. Decreasing by 5 percent multiplies them by .95. This does not get you back to the original numbers. People who are familiar with similar calculations know this. People who have actually gone into the formulas and entered an explicit multiplication factor know this. People without this experience who are dealing solely with words like *increase* and *decrease* do not.

Now obviously, I don't expect *HAL* to perform miracles and to deal properly with the ambiguities of English.





The command "Graph this" is a shortcut to plowing through the 1-2-3 *Graph menu. In this case, the command creates a graph that looks like this. Unfortunately,* HAL *uses many default settings, such as black and white rather than color. You'll have to use the* 1-2-3 *menus to change those.*



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NEIL J. RUBENKING
PIANOMAN, NAMEGRAM

Author Rubenking's goals are straightforward: to have fun with computers and get paid for it. So far he is batting 1000. Along with his technical support position he also edits a column in PC Magazine titled 'Turbo Power User'. His PIANOMAN and NAMEGRAM programs evolved while he was teaching himself Turbo Pascal programming. Finding basic computer tunes "offensive" his PIANOMAN used his musical background as a source to create music on a PC (within the limits of its 2" speaker).

PIANOMAN allows you to:

Play your PC keyboard as if it were a piano, Save and edit your tunes, Compile your tunes to a self-running program & another option turns your tune into a macro for Superkey.

NAMEGRAM is wild, wacky and is a must for anagram (the ability to make a word or phrase from another word or phrase) freaks. After experimenting with algorithms, author Rubenking came up with a program that would handle any size of input and any size of dictionary.

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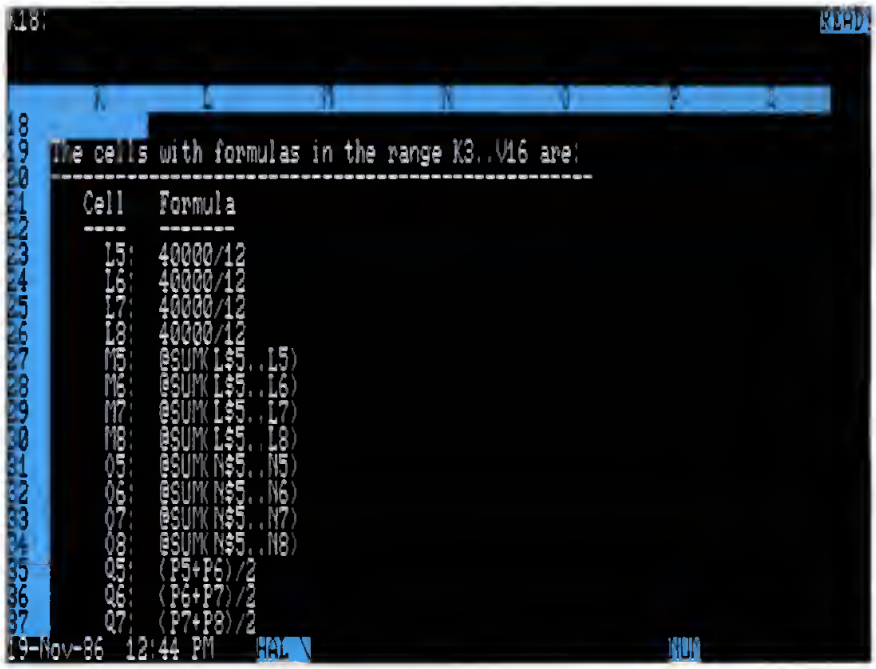
Most programs have documentation on disk and request a donation from satisfied users. Please add $4 postage and handling per order ($10 foreign) — California residents add state sales tax. #289

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CIRCLE 145 ON READER SERVICE CARD

■ HAL



This "List formulas" command creates a list of all the formulas in your current table. This is useful for checking the spreadsheet.

A CONVERSATION

(With apologies to Arthur C. Clarke and Stanley Kubrick.)

"That was a very stimulating financial forecast you created, Dave."

"Why thank you, HAL."

"I particularly enjoyed the stacked bar graph that showed projected profits by region over the next 5 years."

"I was pleased with that also. You helped a lot, you know."

(Pause)

"Do you mind if I ask you a personal question?"

"Sure, HAL. Go right ahead."

"It's not something I can put my finger on precisely, but I detect a certain ambivalence in your attitude toward me."

"Oh, I don't know, HAL. Perhaps it's because I sense that beneath your smooth manner and slick new features, behind your friendly demeanor, you're still the same dumb old indispensable spreadsheet that we all know and love and still complain about."

(Pause)

"I'm not sure how I should take that."

"I'm not sure either, HAL. That's part of being human, you know."

—Charles Petzold

All I want is a question. When I enter "Increase sales by 5%" followed by "Increase sales by 10%", I want *HAL* to ask me a question: "Do you mean increase the original sales figures by 10% or further increase the sales figures that you already increased by 5%?" Once *HAL* does that, then I'll be ready to say that we have a very important product here. I'll be ready to say that something's happening . . . something wonderful. PC

Charles Petzold is a contributing editor of PC Magazine.

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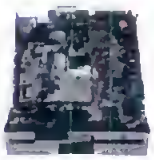
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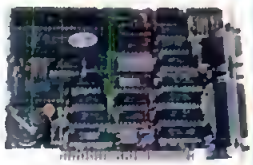
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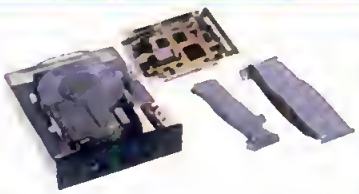
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CIRCLE 350 ON READER SERVICE CARD

886-6

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CIRCLE 391 ON READER SERVICE CARD

Until now, all word processing software fell into one of these two categories.



LOW-COST WORD PROCESSORS: MORE POWER FOR THE MONEY

Slash those prices, add those features, and spiff up the interface. That's the battle cry for this bunch of word processors.

Some old, some new, plenty borrowed, and all running on Big Blue. This year's bumper crop of low-cost word processors is the most competitively priced ever. Some, like *Volkswriter Deluxe Plus*, *PC-Write*, and *PFS:Professional Write*, are vintage products. Their latest versions answer the user's plea for features. A few newcomers like *Webster's New World Writer* enter the market with mandated aggressive pricing strategies. *WordStar* lookalikes such as *PractiWord* and *My Word!* offer *WordStar* keyboard command compatibility combined with attractive enhancements for a fraction of the price of the 7-year-old classic. MicroPro

International Corp.'s *Easy Extra* reaches out to those who value ease of use from the *WordStar* people.

All of the packages are positioning themselves in the economy price bracket; most are priced under $100. To a large degree, the "how low can it go" pricing strategy is fueled by the unprecedented drop in the price of PCs.

LOW COST DOESN'T MEAN LOW PERFORMANCE In a simpler time, low-cost word processors were synonomous with limited performance; they were part of a you-get-what-you-pay-for market. While this definition still pertains to some of the crowd, others are positioning themselves in the new commodities market, offering considerable power for a low price. While the big leaguers such as Satellite Software International's *WordPerfect*, Version 4.1, *Microsoft Word*, Version 3.0, Ashton-Tate's *MultiMate Advantage*, and Micropro's *WordStar 2000* are still the winners of any count-'em-up features contest, the gap is narrowing.

DISPOSABLE PROCESSORS Two extraordinarily low-cost packages are *Cut and Paste* and *Textra*, costing $14.95 and $19.95, respectively. *Cut and Paste* has virtually no features, but *Textra*, despite its K-Mart–style price tag, is incredible. It's a full-fledged word processor with comprehensive on-line help and formatting capabilities. The low price tags make these packages the first almost-disposable word processors. It's not inconceivable to buy them, try them, and toss them in the can if they don't fill the bill.

The bargain bonanza of the bunch is undoubtedly Brown Bag Software's *Brown Bag Word Processor*. For $129 you get a word processor, a DOS shell, an outline program (PC-Outline), a spelling checker, and Homebase (a well-endowed desktop utility). All are high-quality software components, so if you're looking for the biggest bang for the buck, look no further.

FEATURES GALORE Many of the new low-cost word processors can perform mail-merge, have built-in spelling help, import and export ASCII files, offer sophisticated search-and-replace capabilities, have header and footer features, and provide a slew of on-screen and print formatting controls.

What's the catch? The explanation for the low-cost/high-quality phenomena lies in marketing. Young upstarts must price aggressively to penetrate the word processing market. The giants of the industry have giant price tags and a giant list of features. These do-it-alls have extensive dictionaries, complex formatting capabilities, keyboard and text macros, on-screen WYSIWYG, multiple types of tabs, headers and footers, outliners, index generators, extensive printer support, and other features that put them in a league unto themselves—but they cost big bucks.

■ At $14.95 and $19.95, respectively, the low price tags make *Cut and Paste* and *Textra* the first almost-disposable word processors.

In order to tread among the established giants, a package must have some perceived added value. For some the added value takes the form of a less complex program; for others it may mean something as quirky as *MindReader*'s nontypist mentality or *PC-Write*'s renowned shareware philosophy. For others, rock-bottom price is incentive enough. Ease of use, high performance, and low cost are the trio of forces at play in this marketing formula, and the low-cost pack is continually striving to achieve the balance.

A WAR ON TWO FRONTS Two major low-cost word processing camps are emerging. The first camp contains the traditional low-cost word processing package. It is geared to users who have modest word processing needs and want instant word processing gratification. The second camp is the more elusive value-added niche-market camp. These programs use their own "robbing Peter to pay Paul" strategy and ultimately come up with a list of features and attractions that may or may not suit your style. While these typically don't have as complete a list of features as the expensive word processors, they handle some advanced features remarkably well while retaining that easy-to-use aura.

Key players on the no-features end of the spectrum are *Cut and Paste*, *THE Wordprocessor*, *Executive Writer*, and *FriendlyWriter with FriendlySpeller*. These programs have limited features. You can use them almost instantly. Unfortunately, once you decide to install a printer or reformat the document, you find the process is agonizingly limited.

On a higher tier, packages like *Bank Street Writer Plus* and *Easy Extra* offer the ability to type the text, search and replace a few items, print without extensive formatting commands, and satisfy the majority of modest needs a majority of the time. They are intuitively simple to navigate. By limiting the number of features, these programs can offer lower prices and are guaranteed to require less time to learn the program. Those who require only minimal editing and formatting should opt for this 60-minute-gourmet philosophy.

OUTGROWN, ALREADY? Packages that are short on features may have a short life span for an aspiring writer. *Bank Street Writer Plus*'s edit-versus-write environment forces writers to stop and consider which mode they are in. *Easy Extra*'s lack of search-and-replace options makes it a poor choice for anyone who does a great deal of editing.

Ambitious users can find low-cost programs that grow as their needs do. *Electric Pencil* and *PC-Write* are full-featured, fast, and responsive but are also difficult to learn. Pull-down and pop-up menus are noticeably absent, and the list of commands is awesome.

On the highest low-cost plateau are packages such as *Volkswriter Deluxe Plus*, *PFS:Professional Write*, and *Webster's New World Writer*. These programs are almost but not quite as full featured as the big guys, yet each one displays good taste and good design sense in its implementation of the features. *PFS:Professional Write* dresses up *PFS:Write*, the king of the low-

cost word processors, with a bright new user interface and features galore; *Webster's New World Writer* incorporates a top-notch spelling checker and thesaurus with seamless integration; and *Volkswriter Deluxe Plus* is fast and so full-featured that it leaves out only a few of the more esoteric features of its full-priced counterpart.

Some of the packages are niche products in search of an audience. *MindReader*, with its unique word-completion feature, its Rolodex, math functions, macros, and draw capabilities, offers a word processor in an environment. *PC-Write* appeals to writers with a penchant for speed and a good memory for commands. If you use a word processor daily, learning the complexities are worth it.

WordStar earned the right to its high price tag because it came first. While *WordStar* is regarded as prehistoric by many, those who want *WordStar* at a fraction of the price will find plenty made in the *WordStar* image. *My Word!* is a *WordStar* clone that scraps the more esoteric features of *WordStar* and adds simple math capabilities and increased performance speed. *PractiWord* is also a low-cost *WordStar* lookalike.

Other low-cost programs are dinosaurs. *Executive Secretary V*, for example, requires a BASIC interpreter at installation. Many still don't offer WYSIWYG and have no on-screen viewing capabilities.

The best low-cost processors concentrate on an intuitive user interface. *PFS:Professional Write* and *Webster's New World Writer* are pretty to look at, and pull-down menus keep the depth of both programs hidden until needed. Others like *Electric Pencil* offer a less glamorous but equally functional solution by using five different levels of on-screen help.

EMBRACING HARDWARE One gratifying trend in the low-cost arena is the recognition of high-tech hardware. The use of color, increased printer support including support for laser printers, support for EGA, the use of path and drive facilities, and the absence of copy protection signify that these packages are ready for sophisticated audiences with sophisticated equipment. Only 3 of the 18 packages are copy protected. More than half use color, and over half support the HP Laserjet. Packages such as *PFS:Professional Write* and *Volkswriter Deluxe Plus* allow you to save in various formats such as ASCII, DCA, and PFS.

WRITING AS IT SHOULD BE Previously, low-cost word processors suffered from a nonsynergistic look at the writing process, such as command mode versus writing mode and print mode versus document mode.

The latest bunch is migrating away from these binary divisions. You used to need to exit *PC-Write*'s document and enter a print program; now that program is a convenient option on the main menu. With most, you enter the commands during the writing process, and the transition to a print option is seamless.

One area where low-cost processors don't excel is WYSIWYG. Very few of the processors can show page breaks, headers, footers, and justifications on-screen. *Webster's New World Writer* and *PFS:Professional Write* do it best. If on-screen formatting is important to you when you work with a word processor, a higher-priced package may be required.

THE HEART OF THE MATTER Proceed with caution. Word processors at low prices are not uniformly good or bad. There are terrific discrepancies. Pit a wish list of features you desire against our features table and reviews before you buy. "Slash those prices, add those features, and spiff up the interface" is the battle cry for this bunch of processors.

A year ago *Cut and Paste* was $34.95; now it's $14.95. *MindReader* was $189; now it's $65. *Easy Extra* was $150; now it's $99. The trend is also to revise by adding features. *Volkswriter Deluxe*, Version 2.2, begot a richer *Volkswriter Professional Deluxe*. *PFS:Write* begot *PFS: Professional Write*. And in the case of *WordStar* begetting *Easy Extra*, the inverse is also true.

You can buy a respectable amount of word processing power for under $200, and the schism between low-cost word processors and their feature-laden high-cost counterparts diminishes daily. Are they worth it? It's hard to say. The high-priced packages have established support, constant revisions, and enough features to keep you happy for years. While the high-priced packages when tackled as a whole are more difficult to use, they can be mastered with a linear strategy. You can exist nicely using the same ten commands in *WordPerfect* or *Microsoft Word* until you feel the need to move on.

WHO NEEDS IT? Low-cost word processors answer a number of different user needs. There are the first-time user who wants painless satisfaction, the executive who has minimal needs for advanced processing capabilities, and the user with a limited budget.

Because different users require different writing tools, no single word processor has emerged or probably ever will emerge as the most popular. But as this evolution of power continues, your dollar will be able to buy you more and more word processing options in the future.

—Robin Raskin

OUR REVIEWERS

Christopher Barr is a frequent contributor to *PC Magazine* and operator of the PC Magazine Interactive Reader Service.

Jon Pepper is a frequent contributor to *PC Magazine*.

Robin Raskin is a free-lance writer and a frequent contributor to *PC Magazine*.

Daniel J. Rosenbaum is a free-lance writer and editor of *The Wiretap*, an industry newsletter.

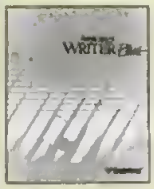
Stephen Sagman is publisher of a New York–based electronic music newsletter.

Phil Wiswell is a frequent contributor to *PC Magazine*.

Bank Street Writer Plus

Bank Street Writer Plus from Broderbund Software is the latest version of the venerable *Bank Street Writer* program that was originally developed as a word processor to encourage children to write. The program design eliminated many of the common foibles of other products, allowing navigation through its features in a

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Bank Street Writer Plus
Broderbund Software
17 Paul Dr.
San Rafael, CA 94903
(415) 479-1700
List Price: $99.95
Requires: 128K RAM (256K RAM with automatic spelling checker), one disk drive, DOS 2.0 or later.
In Short: An inexpensive word processor originally designed to encourage children to write. Extremely easy to use, but limited for anyone except beginners. Copy protected.

CIRCLE 682 ON READER SERVICE CARD

straightforward and reassuring manner.

This latest release has both improved on some of the previous version's shortcomings and added some new features. It now has a 60,000-word dictionary, a thesaurus, pull-down menus, and a pop-up calculator. For those on a modest budget or with any sort of computer phobia, *Bank Street* is a program to look into. However, be advised that since its overall orientation is weighed heavily toward ease of use, it is not as flexible or as powerful as some other programs.

QUICK START The advertising for *Bank Street Writer Plus* claims that "word processors don't get any easier than *Bank Street Writer Plus*." This may in fact be true. For example, hard disk installation entails copying the files and typing BSW. From that point, you can probably follow the screen instructions and prompts without referring to the manual.

The *Bank Street* screen has a boxed work area, with prompts and messages surrounding it at the four corners. The upper left says "type in text at cursor" and indicates that you can move the cursor with the arrow keys. The upper right shows that pressing Esc will bring up your menu, the bottom right indicates that Alt-H will bring up the help screen, and the lower left shows what drive your data files are on. This approach is extremely straightforward and works well.

Bank Street views writing and editing as two different tasks. When you first bring up the program, you are in the writing mode, where you can enter text into the 20-row work area. Write mode is an insert-only mode; while you can delete text, you can't overwrite it. In order to do serious editing, block moves, and so on, you must access the file menu by pressing Esc.

There are six choices in the menu that strings across the top of the work area: File, Edit, Spell, Options, Disk, and Quit. The cursor block must be moved with the arrow keys to highlight your choice, and pressing Return will make a pull-down menu appear with your options. The Edit menu, for example, has Erase, Undo Last Erase, Move Block, Undo Move, Copy Block, and Find/Replace as options. Each one of these choices can be accomplished fairly easily by following the on-screen instructions every step of the way.

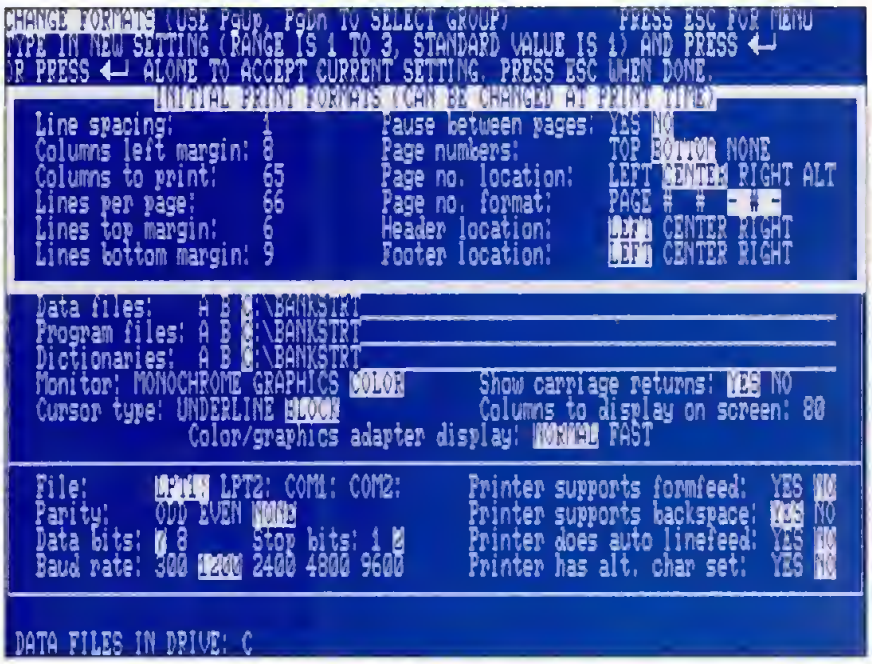
Besides the menus, *Bank Street Writer Plus* uses numerous Alt-letter key combinations, all of which are assigned mnemonically—Alt-B for boldface, Alt-C for center, and so on. This is a big improvement over some ease-of-use programs that require plowing through menus and submenus in order to perform any function.

Interestingly, *Bank Street* does not assign chores to the ten function keys but allows users to define them through the options menu and provides a blank template to be filled in by the user. This is an extremely nice touch that works well for a program like *Bank Street* with a limited number of functions.

Overall performance is fair for *Bank Street Writer Plus*. It certainly won't threaten *XyWrite* as a speed demon, but it should be decent for home and school chores. The spelling checker and thesaurus work well, but the spelling checker is particularly sluggish in its performance.

One nice touch is the print time menu, which allows you to indicate headers and footers at the time of printing, a method that is both easy to use and efficient. It avoids some of the complexities that other programs have with this task.

NOT FOR EVERYONE *Bank Street Writer Plus* is not without problems, and most of them emanate from its "let's be friendly" approach. It's slow, but worse than that is its annoying habit of asking you to verify virtually every move. This may be reassuring to beginners, but it grows old very quickly. Block moves are limited to a measly 15 lines of text, and margin format



Broderbund Software's Bank Street Writer Plus *has an extensive format menu that gives you one-stop document design. The rigors of custom formatting are reduced to a series of simple options.*

changes do not show up on-screen. There are a few other quibbles, but you get the idea—this is not a heavyweight program.

Users who want ease of use or who are simply looking for an inexpensive word processor for the home might consider *Bank Street Writer Plus*. It is well supported and documented, has most of the necessary basic features, and is exceedingly easy to use. However, this is most definitely not a program for writers or business people. Its limitations will eventually stand in the way of constructive writing, rather than facilitate the process.

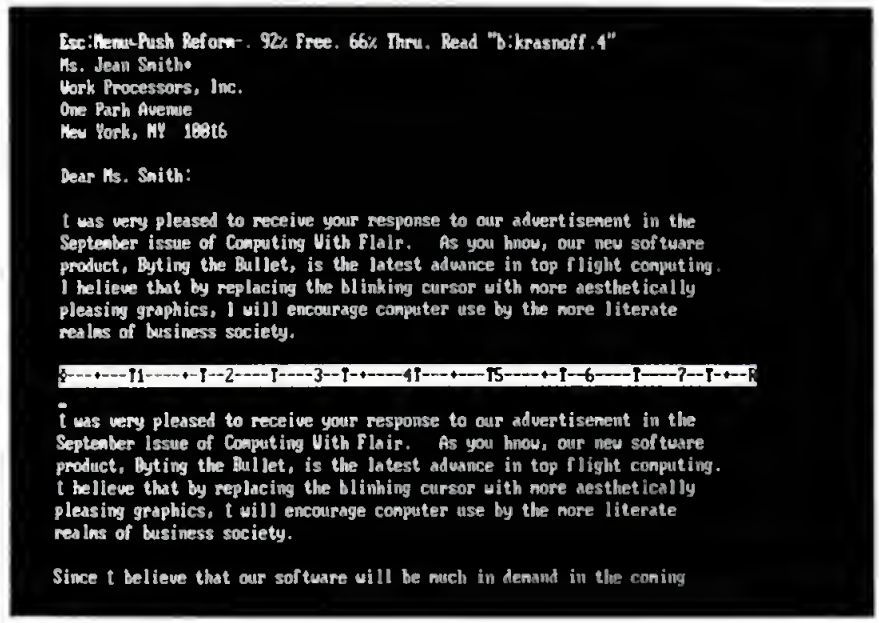
—Jon Pepper

Brown Bag Word Processor

For $129.95, Brown Bag Software is now bundling its *Brown Bag Word Processor* with *PC-Outline* and *Homebase*, making the combined package one of the best software values on the market.

Brown Bag Software licensed *PC-Write*'s code recently, made minor modifications, and added a DOS shell, a screen saver, and its own spelling checker. The DOS shell is a simple menu from which you can access the word processor, configure a printer, perform a set of DOS commands, or execute three other user-configurable choices.

Other than the DOS shell, the spelling checker is the only major functional difference between *PC-Write* and the *Brown Bag Word Processor*.



One of the interesting features of the Brown Bag Word Processor, *which shares its heritage with* PC-Write, *is its split-screen function, high class for an inexpensive program.*

Both products can either check spelling as you type or proof a document once you finish writing. *PC-Write*'s spelling checker options appear on its regular function key menu, and *Brown Bag*'s spelling checker pops up on center screen when you press the two Shift keys at the same time.

Which spelling checker you'll like depends on whether you are worse at spelling or typing. Both products can guess at correct spellings of words they do not find in their dictionaries. *PC-Write* uses a "soundex" to suggest words that sound similar to the misspelled word. Although its guesses were amusing, they were often incorrect. It suggested *regiment*, *argument*, and *resonant* for *recomend*, for example, and never suggested *recommend*. I found that *PC-Write*'s spelling checker was better for flagging typing mistakes to correct manually.

The *Brown Bag Word Processor* displays a list of words that are closest in proximity in its dictionary to the incorrect spelling and, when prompted, offers a list of guesses for a correction. Its first suggestion to correct the same error was right: *recommend*. Even though *Brown Bag*'s spelling checker usually guesses more accurately, it flags contractions like *hasn't* and *doesn't* as errors. Neither the *PC-Write* nor the *Brown Bag* spelling checker is as good as other spelling checkers built into many popular word processors.

Since the two products are so similar, you should decide which to buy based on value. If you need a DOS shell, an outliner, and a set of RAM-resident desktop utilities, the *Brown Bag Word Processor* is the better buy. If you already have all of those, *PC-Write* is essentially the same product for $40 less.

—Stephen Sagman

Cut and Paste

In a world of constantly evolving technology, few things remain the same; *Cut and Paste* does. Except for its price tag, which has been descending since its introduction in 1984 (the new low is $14.95), the program has not been significantly revised. *Cut and Paste* is one of the most incredibly easy to use word processors of all time. Using the word processor is immediately gratifying, and you'll find yourself using the program within seconds of loading the disk for the first time.

Unfortunately, the program's simplic-

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Brown Bag Word Processor
Brown Bag Software
2105 S. Bascom Ave., #164
Campbell, CA 95008
(800) 523-0764
(408) 559-4545

List Price: $129.95, including *PC-Outline* and *Homebase*.
Requires: 256K RAM (384K with spelling checker), one disk drive, DOS 2.0 or later.
In Short: Comes bundled with *PC-Outline* and *Homebase*. Same product as *PC-Write*, with only minor modifications. Not copy protected.

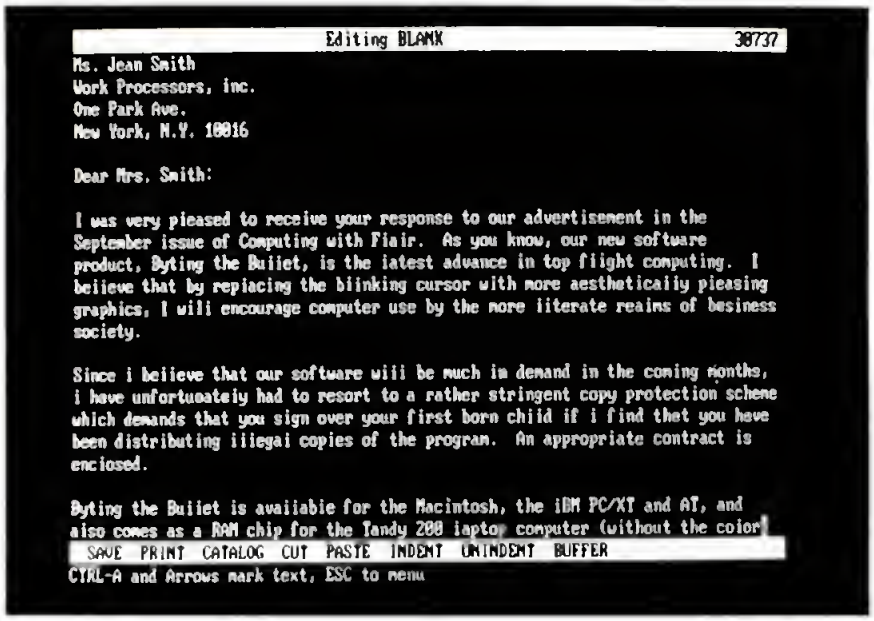
CIRCLE 006 ON READER SERVICE CARD

PC MAGAZINE FACT FILE



Cut and Paste
Electronic Arts
2755 Campus Dr.
San Mateo, CA 94403
(800) 448-8822
(415) 571-7171
List Price: $14.95
Requires: 64K RAM, two disk drives. *Cut and Paste* uses its own operating system (not DOS) and cannot be installed on a hard disk.
In Short: A limited, inexpensive word processor that offers only bare-bones features. Copy protected.

CIRCLE 696 ON READER SERVICE CARD



The options listed at the bottom of the Cut and Paste *editing screen encompass literally all of the program's capabilities. For $14.95, only the essential word processing functions can fit.*

ity is directly proportional to its lack of features. *Cut and Paste*, as its name suggests, allows you to cut blocks of text, store them in a buffer, and paste them elsewhere—and very little else.

The list of what can't be done using this program is considerably longer. There is no centering, no line spacing, no boldfacing or underlining, and no search and replace. There is no on-screen formatting, and print formatting involves selecting between three preformatted document styles. Those who prefer this bare-bones approach to word processing may find the lack of features appealing, but I suspect most users will quickly want more. With *Cut and Paste* loaded (the sole installation instruction is "Start up the program disk as you would any other"), you may insert a document disk and a catalog of documents is presented.

Selecting a document invokes a work area with a single-line command menu on the bottom of the screen. Within the document, you can save, print, catalog, cut, paste, indent, or unindent, and these are the only commands available while editing. It is possible to bypass selecting from the menu by using the program's speedier Alt keys. To cut text you press Ctrl-A (anchor) and begin blocking by moving the cursor. When you complete the block you cut it to a buffer. One nice feature is that the buffer remains even if you change documents. So, you can cut from one document and paste to another.

The indent command allows you to move the left margin five spaces to the right, and the unindent cancels the last indent command. While this is certainly a useful item, given that the menu is so sparse I might have substituted a more utilitarian command, such as a search and replace. A number on the right-hand corner of the screen tells you how many characters you can still fit into memory. For the novice, this file limit is meaningless.

Perhaps the single greatest obstacle for the *Cut and Paste* user is the program's use of some other "unknown" operating system. *Cut and Paste* does not use or recognize DOS commands, so the program exits in a vacuum. You must boot the computer with the *Cut and Paste* program disk in the disk drive. All document disks must be formatted with the *Cut and Paste* disk. You cannot copy the original disk or install the program on a hard disk. There is no import or export of files. If you need to transport your documents to other word processors or electronic mail services you will be in serious trouble. You will be prohibited from taking advantage of the array of add-on spellers, thesauri, and other writing utilities available for today's market.

Cut and Paste does what it does well. It allows you to type, cut, and paste text and store the document on disk. But, as the saying goes, "You've come a long way, baby," and *Cut and Paste* has not changed with the times to meet the increasing sophistication and demands of the user.

—Robin Raskin

Easy Extra

Easy Extra is the low-cost entry from MicroPro International Corp., the folks who unleashed *WordStar* on the world. While *WordStar* attracted a huge legion of

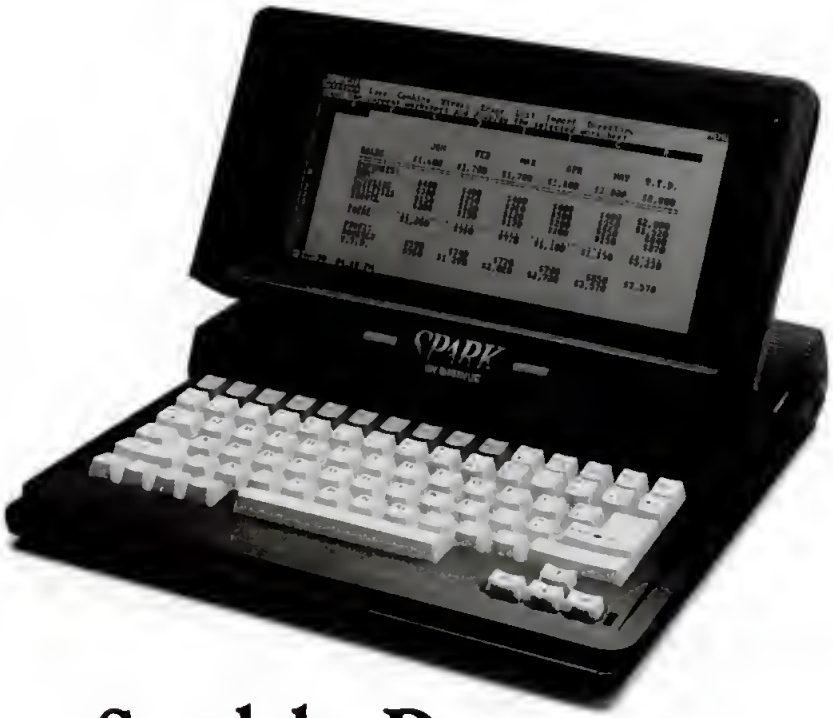
PC MAGAZINE FACT FILE

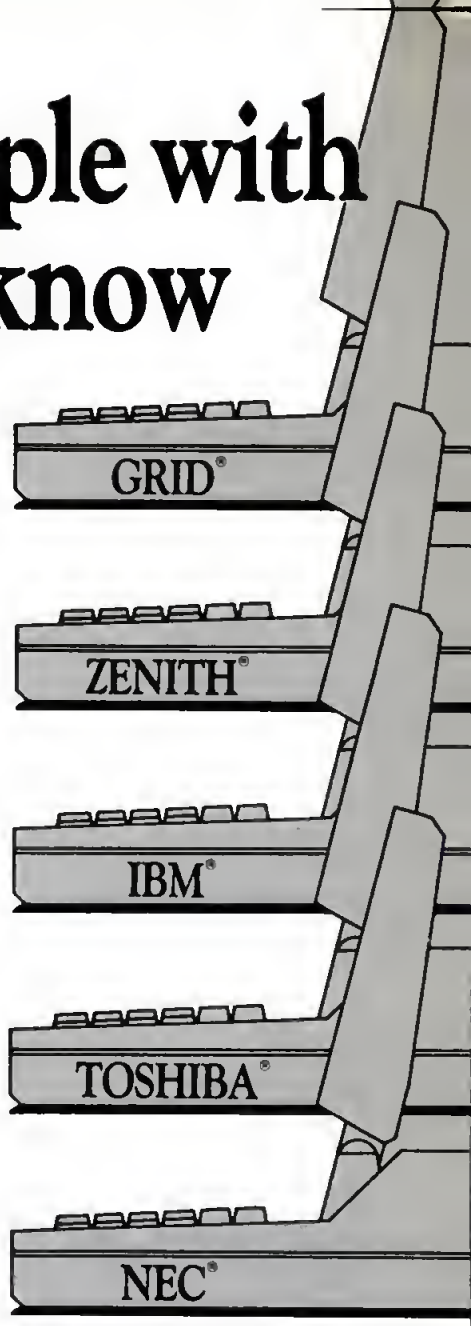


Easy Extra
MicroPro International Corp.
33 San Pablo Ave.
San Rafael, CA 94903
(415) 499-1200
List Price: $99
Requires: 256K RAM (320K RAM for DOS 3.0 or later), two disk drives, DOS 2.0 or later.
In Short: A low-cost, easy-to-use word processor from the *WordStar* folks. It's not all that powerful and sophisticated, but what it does it does well. Not copy protected.

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The Lap Top for people with brains enough to know the difference





Spark by Datavue $995

$1995

They have similar features, so why do the ones on the right cost $1000 more?

We can't figure it out. Maybe the companies on the right charge more to pay for their high overhead. Or maybe they're just committed to the idea of turning as much of your money as they can into their money. Whatever the reason, there is an alternative.

Introducing Spark! the new IBM-compatible Lap Top computer from Datavue. Spark! is loaded with all the features you'd expect in an advanced lap top. Like a super-readable full-size screen (backlit or reflective), dual-speed processor (as fast as any of those other guys), 640K memory, mechanical touch keyboard, and more. But, at just $995, it's $1000 less than the over-priced competition.

Of course, if people want to spend an extra $1000, there's a lot to choose from. But they may end up with less power, or a mushy keyboard, or slow performance. In any event they'll end up with less money.

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DATAVUE™

CIRCLE 191 ON READER SERVICE CARD

users, it also turned off a lot of people with its arcane command structure. Perhaps, as retribution for *WordStar*, MicroPro has made *Easy* true to its name. It is not the most powerful, most sophisticated, or best word processor on the market. It is, however, one of the easiest.

PICTURE PERFECT Unlike the other programs tested, *Easy Extra*, which includes a spelling checker and mail-merge, came with enough disks (six) to make any power user drool at its impending complexity. However, *Easy* wasn't any more difficult to install; it just took a little longer to do it.

The product has a batch installation process that is virtually foolproof. You type EASY and follow the screen instructions, which even include a graphic representation of a disk drive (so you know where to insert the disks) and a meter that shows what percentage of the disk has been copied. Because of the number of disks, *Easy* is one program that could benefit from a hard disk drive, although it is not necessary.

Both learning and using the program are relatively effortless. The documentation is complete and well done, and it offers a good on-line tutorial. Also, the program is replete with pull-down menus and excellent, context-sensitive help screens. If you can read and type, you can use this program.

TOO MUCH STATUS The status line that occupies the top portion of the screen not only shows your line and cursor position but also contains a ruler line and a constant prompt that F1 will bring help and F2 the function menu. Unfortunately, all of this information also uses up the top 6 lines of the screen, so your maximum work area is cut to 19 lines.

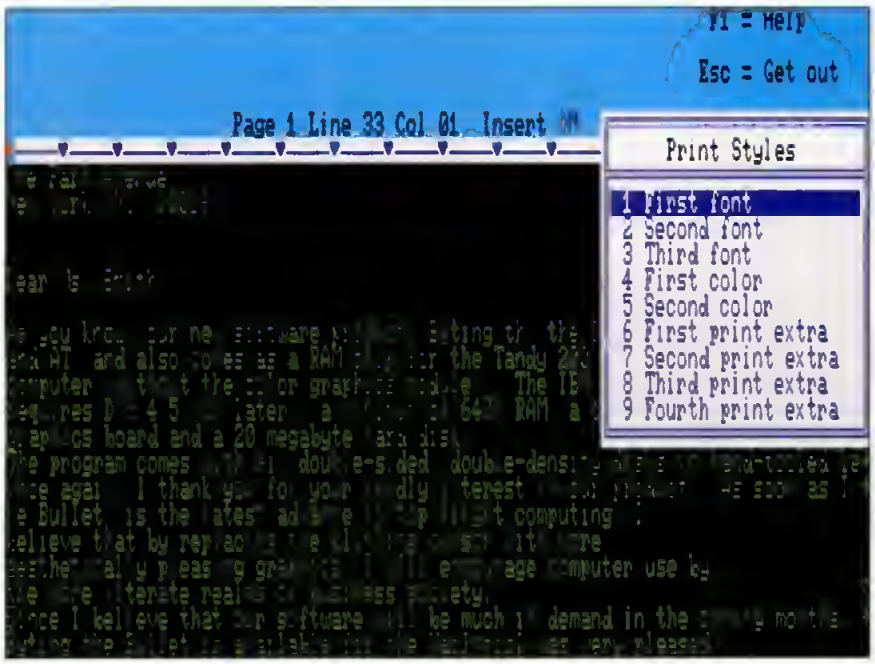
Easy has reduced virtually all of its functions to two menus; F2 toggles between them. Any additional prompts or instructions appear in the status area after a function is selected. This approach has mixed results. On the plus side, it's exceedingly simple to follow, and it's almost impossible to make a mistake. On the minus side, you are pretty much stuck with this approach, since you can't bypass the menus as you become a more experienced user. So while many word processors let you toggle underline on and off with a keystroke, *Easy* forces you to move through a series of menus and keystrokes to accomplish the same process. However, the product is designed for inexperienced users, and it meets that need.

In general, *Easy Extra* has a lot going for it. It shows page breaks, margin settings, underline, and boldface on-screen, and features an excellent spelling checker. The Undo features will make new users feel comfortable, and it also gives you an unusually high degree of control over its features for a product of its class. For example, you can decide if you want to default to insert or overstrike, make a search case sensitive or not, and change many other settings. *Easy* also supports a large number of printers, offering fine control for mixing fonts and colors (if your printer supports those capabilities).

On the down side, it lacks the ability to jump to a specific page—a real drawback when editing a large document—and doesn't offer such amenities as macros, math, or support for graphics in a document.

Still, it's hard to fault *Easy* for what it does. The obvious intent was to create a product that would be easy to learn and use, and in that regard, MicroPro has succeeded admirably. The real question is not if you will like *Easy*, but for how long; this is a product that you can outgrow.

—Jon Pepper



In the case of MicroPro International Corp.'s Easy Extra, *ease of use is achieved through a system of pull-down menus. In this example, a selection of print styles is offered. The status line reports page, line, and column numbers.*

Electric Pencil

It's amazing how much $49.95 will buy. Not long ago, word processors like *Electric Pencil* just weren't available at this kind of price. What you get is a fast, powerful program with all the standard editing tools, a 100,000-word spelling checker, and the ability to customize almost every command.

The name might sound familiar because Electric Software's *Electric Pencil* has been around for 10 years. There was a TRS-80 version written in the late 1970s, first available on tape and later on disk. *Electric Pencil PC*, the current version, is not a translation of the early program but a complete rewrite, with added modules, in 8088 code.

Like other feature-laden software, *Electric Pencil* is not easy to learn. It has

"Dear Jim, For once I'm fast, not furious."

This is the first day I can remember getting even a memo produced without a problem. It's also my first day using this new PFS:Professional Write program. That's no coincidence. For once my documents looked really professional, and they took less time and hassle. This program has everything, even mail merge pulling in data from our company files, and a built-in address book to keep track of people like you. I know we've had our furious moments getting documents out on time, Jim. That's why I thought you should know about Professional Write.

PFS:® Professional Write

Word Processing Software

Power. *77,000 word spelling checker. Personal dictionary. 180,000 synonym thesaurus. Integrated address book and full mail merge with ASCII and Professional File data. Line drawing. Underline, boldface, italic and other enhancements. Right justification. Single/double line spacing. Indented text and advanced block operations.*

Performance. *Fast operation and printing. Macros. Speed keys. Supports virtually all popular printers, including the HP LaserJet printer.*

Fast To Learn/Efficient To Use. *Screen resembles a standard sheet of paper. What you see on screen is what is printed. No cryptic commands or on-screen symbols. Pull down menus display all options. On-screen help anytime.*

Office Integration. *Built-in IBM DCA document interchange. Reads/writes ASCII data. Incorporates graphs, reports, and spreadsheets from selected sources.*

Network Support. *Runs on the IBM® PC Net, 3Com® 3+,™ and Novell Advanced NetWare™/86 networks.*

Ask your nearest dealer for a demonstration today. *© Software Publishing Corporation, Mountain View, CA.*



PFS:Professional Write. Expect Results.

PFS: WRITE owners call 1-800-255-5550 for upgrade information.
(IBM and compatible PC owners only: Alaska and Canada call 1-303-799-4900).

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Electric Pencil
Electric Software Corp.
9230 Markville Dr.
Dallas, TX 75243
(800) 445-9004
(214) 234-8466
List Price: $49.95
Requires: 128K RAM, one disk drive, DOS 2.0 or later.
In Short: A fast, full-featured powerful word processor. It's a great value for the price but is somewhat difficult to learn. Not copy protected.

CIRCLE 684 ON READER SERVICE CARD

many options, but once you get the hang of it, you will be impressed with its performance. *Electric Pencil* gets down to business quickly: as soon as you load it you are dropped into text entry mode. A 15-line help screen is at the bottom of the screen, allowing only 9 lines of text, but you may choose one of five help levels and show up to 25 lines of text. Ctrl-key combinations switch you between the different menus including the system, print, proofreader, and tutor modes. Ctrl-key couplings are used to execute most of *Electric Pencil*'s cursor movement, editing, proofreading, and utility commands. Printing and system commands are issued through the menus. There are quite a few commands to learn (more than 500 according to the manufacturer), but then again, there are quite a few features.

The maximum file size of 64K bytes explains the program's speed as this is a relatively small buffer. *Electric Pencil* can read in from a larger file but only in 64K blocks at a time, saving each block as a separate file. If you don't use any RAM-resident software, such as *SideKick*, which *Electric Pencil* is compatible with, you may utilize the 80-character type-ahead buffer and really make this program sing.

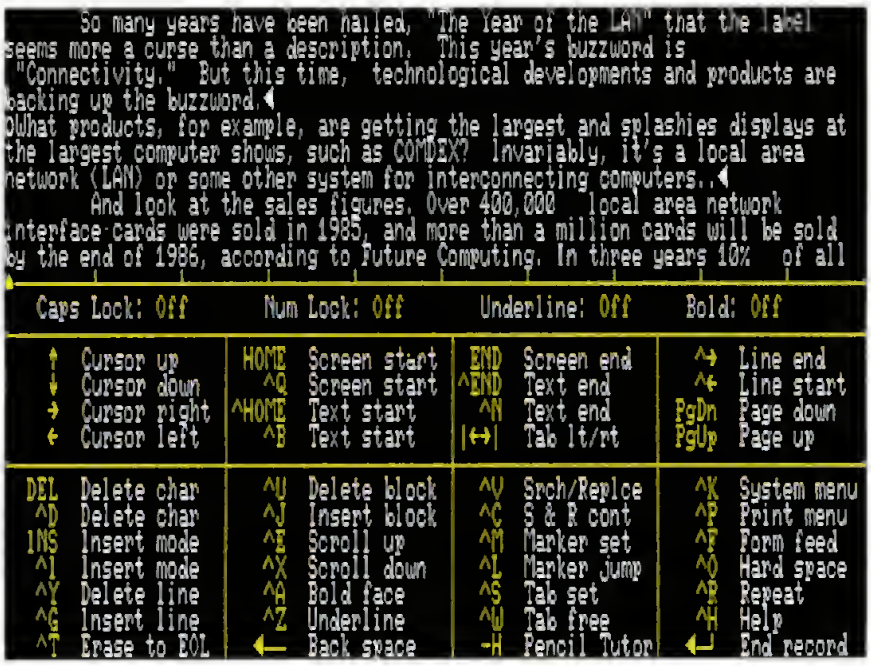
On-line help is referred to as the "tutor mode." What you get are 80 pop-up windows with a description of the commands in question and the page in the manual to turn to for additional help. A 25-lesson tutorial, not to be confused with the tutor mode, is available in the manual.

Printing is handled with the characteristic speed and efficiency of *Electric Pencil*'s other modules. The print menu offers you choices ranging from margins to bit-per-second rates. If you like, you can preview output to the screen exactly as it will be printed. If the print menu is not complete enough for you, and it probably will be, you can embed commands within your document to control the print format. By using embedded commands, you are able to include an entire stored file from disk or chain files to print consecutively.

Electric Pencil has a spelling checker module that is quite impressive. It operates in three modes: browse dictionary, check a single word, or check an entire file. Words can be added to the dictionary and to the list of commonly misspelled words.

The advanced features offered in such an inexpensive package are numerous. All of the function keys (F1 to F10) may be reprogrammed with a string of up to 16 characters. For that matter, the entire keyboard can be reprogrammed, making *Electric Pencil* completely customized. You can also configure *Electric Pencil* to automatically save your document at specified intervals during editing. It even has a unique file copy and recovery utility that makes it possible to salvage files from damaged floppy disks.

With so many options, *Electric Pencil* is not for beginners but for those who want a powerful word processor that they can grow with, without paying a lot for it.
—Christopher Barr



The Electric Pencil *help screen showing available commands appears over the text file. There are five different levels of help available to the user, and while they may not be glamorous, they are very functional.*

Executive Secretary V

Executive Secretary V from Glencoe Publishing is written in interpreted BASIC, which makes it ugly and more than a little clumsy to use. You must have a copy of whatever BASIC interpreter came with your computer to install it. The program comes with source code, of course, so you can tinker with it if you want to.

Executive Secretary V was originally written for Apple computers, which, even if the documentation didn't say so, is obvious. It hardly uses the cursor keys, and the function keys are completely ignored. To scroll, you use the numeric keys on the keyboard's top row.

Another thing that makes it clumsy is its use of modes—text entry is a different step from editing. The edit mode uses regular



The first screen of Glencoe Publishing's Executive Secretary V *is surprisingly simplistic. It leads you to an edit mode that is among the least complicated of all the programs.*

alphanumeric keys to manipulate text. Trying to enter a D, for instance, will delete a character.

Switching between modes is a matter of only a single keystroke, but nonetheless it's an inconvenience.

In spite of its drawbacks, *Executive Secretary V* is surprisingly full-featured. It has a complete set of text-formatting commands available, similar in concept and use to *WordStar*'s dot commands. You can circumvent limitations on file length (about 2,500 words) by using chained printing. Full headers and single-line footers are supported. The program can keep track of lists and renumber them when they are manipulated.

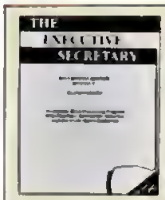
■ *Executive Secretary V* may suit some newcomers and grow with them for a surprisingly long time.

Furthermore, *Executive Secretary V* will perform surprisingly sophisticated merges, including accepting information from a card-file database or the keyboard. The program will convert database files from several formats for use in its card files, and it includes simple telecommunications support—so simple, in fact, that the manual advises that the program can't keep up with a 1,200-bit-per-second modem.

Time undeniably has passed by *Executive Secretary V*. If you've used much else in the way of word processing, its limitations will be annoying. But it may suit some newcomers and grow with them for a surprisingly long time.

—Daniel J. Rosenbaum

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Executive Secretary V
Glencoe Publishing
15139 Chatsworth St.
Mission Hills, CA 91345
(800) 423-9534
List Price: $104.80
Requires: 128K RAM, one disk drive, BASIC, DOS 2.0 or later.
In Short: A clumsy word processor written in interpreted BASIC. Surprisingly full-featured. Not copy protected.

CIRCLE 689 ON READER SERVICE CARD

Executive Writer

Executive Writer is a program designed for users who don't want to waste a lot of time memorizing commands. It has a surprisingly large list of useful functions, and only a few drawbacks. And, priced at $69.95, the product is well positioned in the market.

Executive Writer is distributed by Paperback Software International, the brainchild of Adam Osborne. The products from Paperback Software are, in general, easy to use and quite powerful, and *Executive Writer* continues that tradition.

With one exception (to be covered later), there is not a lot of fancy installation here. You can simply insert the distribution disk at your DOS prompt, type EXEC, and you're ready to write.

The opening menu shows four basic options: Directory, Editor, Quit, and Print. In order to edit an existing file you need to know the filename, and you must also name new files before you can begin work. Once you are into the work area, *Executive Writer* really takes off. If you have had your fill of esoteric commands, pull-down menus, and the like, *Executive Writer* will be a breath of fresh air.

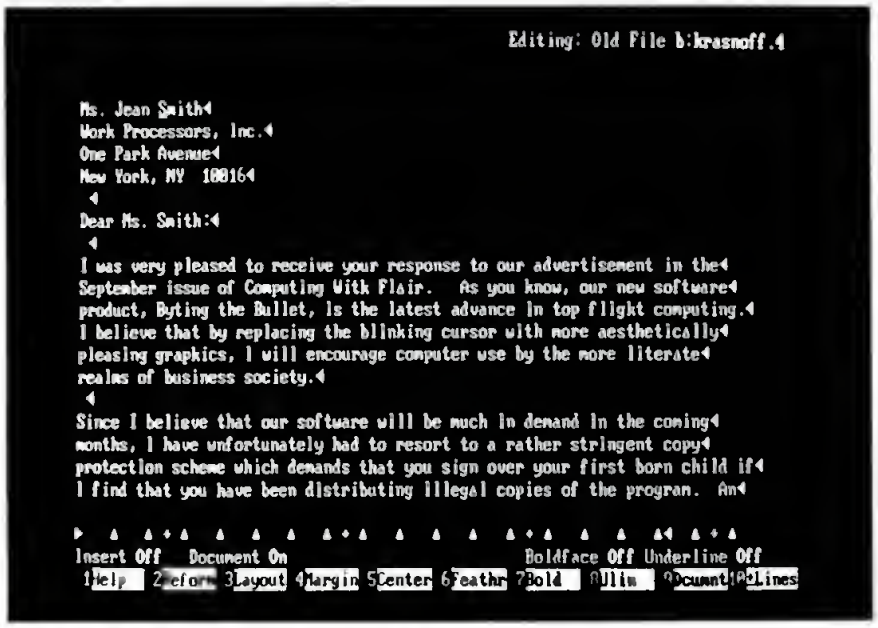
The bottom of the screen has ten reverse video boxes that display the assignments for the function keys. Pressing Ctrl,

PC MAGAZINE FACT FILE



Executive Writer
Paperback Software International
2612 8th St.
Berkeley, CA 94710
(415) 644-2116
List Price: $69.95
Requires: 128K RAM (256K RAM for the IBM PC*jr* and the Tandy 1000), one disk drive, DOS 2.0 or later.
In Short: A fine program that's full-featured and easy to use. Its greatest limitation is that it is copy protected.

CIRCLE 690 ON READER SERVICE CARD



Paperback Software's Executive Writer *is exceedingly easy to use. With its function key menu across the bottom of the screen, sophisticated features are easily accessed.*

Alt, or Shift will cause the functions associated with those combinations to appear in the boxes. This makes learning and using *Executive Writer* a snap.

Executive Writer is fundamentally a WYSIWYG product. Margin changes can be accessed easily and show up on-screen, as do character formats such as underline. Turning underline on and off is a single keystroke operation, which makes it much more direct than most low-cost products.

If you need help, *Executive Writer* offers plenty. First, there is the manual, which is very well done and contains a tutorial section that clearly explains the major features of the product. Second, there is good on-line help. Pressing F1 brings up the main help menu. To get help on a specific function, you press the key associated with that function, such as F3 for layout. This method is similar to the one used by *WordPerfect* and is quite effective.

As far as features go, *Executive Writer* has more than its share. There is global search and replace, up to ten 100-character macros, table of contents generation, headers and footers, and horizontal scrolling. *Executive Writer* can also import and print graphics files from programs like *1-2-3*, a feature that few low-cost products have.

The program also has a series of "feather" commands, which are somewhat akin to *WordStar*'s dot commands. The feather commands control headers and footers, page numbering, print control codes, and other advanced features. However, you can make good use of the product without learning these commands, and spend some time with them after you become comfortable with the basic functions.

To print documents, you need to save your file and access the print commands from the starting menu. This is a bit of a nuisance for experienced users, but probably not for novice users.

NOT QUITE PERFECT With all these things going for it, what are the problems with *Executive Writer*? There are two main drawbacks, and one is more serious than the other.

First, the product doesn't have automatic paragraph reformatting, which is a curious omission in such a full-featured program. This is not a reason to avoid the product, but adding this feature in a future release would be a nice improvement.

The second drawback is that *Executive Writer* is copy protected. This is a reason to avoid buying it. Copy protection makes installation on a hard disk extremely annoying, and backup of the distribution disk impossible. While *Executive Writer* does offer a version without copy protection (for $10 extra), there is simply no need to copy protect such a low-priced product.

Otherwise, *Executive Writer* is a fine performer. It is well priced, well documented, full-featured, and easy to use. If Paperback Software dropped the copy protection, the product could be recommended without qualification.

—Jon Pepper

FriendlyWriter with FriendlySpeller

FriendlyWriter with FriendlySpeller is one of a plethora of programs whose main claim to fame is ease of use. And while it certainly is easy to use, this is not a good enough reason to buy the product. Its manufacturer, FriendlySoft, hasn't added any other value to the package.

Setting up and installing *Friendly Writer* is, well, friendly. It has a batch install utility for hard disks, and the program has so few options that you make virtually no decisions, other than monitor type and default drives.

Typing "Writer" brings up the menu, a spartan affair with five choices: Write a new letter (F1), Select a letter on file (F2), Maintenance (F7), Help (F9), and Return to DOS (F10). The first two choices, in case you are wondering, are correct. *FriendlyWriter* refers to documents as letters—not reports or manuscripts. This might seem condescending, were it not for

PC MAGAZINE FACT FILE



FriendlyWriter with FriendlySpeller
FriendlySoft Inc.
3638 W. Pioneer Pkwy.
Arlington, TX 76013
(800) 527-6530
(817) 277-9378
List Price: $89.95

Requires: 128K RAM, one disk drive, DOS 2.0 or later.

In Short: An easy-to-use, but limited word processor. Not copy protected.

CIRCLE 694 ON READER SERVICE CARD

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Millions of people speak English. But unfortunately, computers don't. So to get information out of one, you have to learn computerese. Which seems a little backwards to us.

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Professional software evaluators agree.* Here's what PC Week's Jim Seymour had to say: *"Q&A is the quintessential manager's product...a near perfect tool for people who want to poke around in customer lists, personnel lists, product lists, and who also need to write reports and letters..."*

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CIRCLE 251 ON READER SERVICE CARD

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16 million records	Built-in spelling checker
2400 fields per record	Imports Wordstar, ASCII, PFS Write, IBM Writing Assistant
115 simultaneous indices	Automatic mail-merge with database files
Searches files as fast as dBASE III	Automatically prints envelopes
Imports dBASE, 1-2-3, Fixed ASCII, DIF, PFS File/Report	

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MAKE YOUR IBM PC FASTER THAN AN AT.

IN JUST 5 MINUTES!



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Introductory offer

DON'T TAKE OUR WORD FOR IT. USE IT FOR 60 DAYS. IF YOU ARE NOT TOTALLY SATISFIED RETURN IT FOR A FULL REFUND.

It sounds great; the idea of a speedup board that you can just plug right in as easily as putting bread in a toaster. How wonderful to be able to convert a PC or XT to a $4000 AT without the expense. But even when you get ready to spend $395.00 you want to be sure your choice is the very best.

Here at PCSG we sell our IBM PC disk access speedup software by the thousands. But software doesn't do anything about speeding up the microprocessor (or CPU) speed. As you know the microprocessor is the brain of the computer that controls all the operations like screen updates and calculations like a spreadsheet makes.

Faster and smarter than an AT – PCSG guarantees it.

We wanted to offer a speedup card that would be the compliment to our disk speedup software, (incidentally included at no extra charge.) We wanted it to be literally the most advanced, fastest, most feature rich board available today. We could only be satisfied with a board that was the finest example of the engineering art.

There is no question we have met our every objective by developing and manufacturing the *BREAKTHRU 286* card. This is the best designed and most functional speed up card available today. We guarantee it.

HERE IS WHAT MAKES IT SO SPECIAL.

First, it installs so easily. It is a half slot card, only five inches in length. You don't even have to give up a full slot. What's more, unlike competing products it works in the Compaq and most clones. The instructions are so simple we considered showing a picture of a child putting it in. Easy diagrams show how you just place the card in an open slot, remove the original processor and connect a single cable. There is no software required. From that moment you are running faster than an AT.

Second, it is advanced. The *BREAKTHRU 286* replaces the CPU of the PC or XT with an 80286 microprocessor that is faster than the one found in the AT. A 16K cache memory provides zero-wait-access to the most recently used code and data. In benchmark tests the card accelerated software programs—both custom and off-the-shelf anywhere from 200% to as much as 700%. Wow!

Third, you have full compatibility. All existing system RAM, hardware, and peripheral cards can be used without software modification. It operates with LAN and mainframe communication products and conforms to the Lotus/Intel/Microsoft Expanded Memory Specification (EMS). Software compatibility is virtually universal.

Fourth, it is the best there is. There are several other boards on the market. Some are priced about the same as the *BREAKTHRU 286* and some are cheaper. We at PCSG have compared them all, but there simply was no comparison. What we discovered is that many cards being sold offer only a marginal speed up in spite of their claims. We found some to be merely versions of the obsolete 8088 or 8086, and others to be just poorly engineered. The 8MHz *BREAKTHRU 286* is unequivocally the best executed and most completely reliable speedup board manufactured today.

PCSG has since early 1983 dominated the lap portable market with ROM software such as Lucid spreadsheet and Write ROM that reviewers rated as excellent. We were proud to successfully enter the IBM PC market last year with disk access speedup software. Now we are so pleased with the *BREAKTHRU* speedup card. We use them on our own PC's to make them faster than AT's. We are really excited about this product.

PCSG makes the unabashed statement that the *BREAKTHRU 286* card represents more advanced technology than boards by Orchid, Quadram, Victor, Mountain, P.C. Technologies, Phoenix... we could go on.

But an ad can't let you experience it for yourself. That's why we sell the *BREAKTHRU 286* on a 60 day trial. If you aren't completely satisfied return it within 60 days for a full refund. It is priced at $395. Call today with your MasterCard, Visa, American Express or COD instructions and we will ship your card the very next day. **CIRCLE 489 ON READER SERVICE CARD**



PERSONAL COMPUTER SUPPORT GROUP

11035 Harry Hines Blvd. #207 • Dallas, Texas 75229

214-351-0564





FriendlyWriter *from FriendlySoft features an informative status line and full justification, both left and right, on-screen. When you change the margins, however, the on-screen margins do not move.*

the limited utility of the program, which is ill suited for weightier tasks.

If you choose to write a new letter, you are presented with the *FriendlyWriter* work screen. The top few lines of the screen show the current function-key assignments, with the status line sandwiched between those options and your typing area. The status line is actually quite informative. The current line, page, lines free, lines left (to the current page), and character position are all indicated. Vertical bars at the sides of the screen indicate the edges of your work area. Unfortunately, they do not change when margin settings are changed and are therefore misleading.

To its credit, *FriendlyWriter* contains most of the basics for word processing: block moves, search and replace, and a spelling checker. The spelling checker might be the program's best feature; it is quick, offers several good alternatives for words, and will replace words in context on the screen. Similar kudos cannot be given to the search and replace function, which is insensitive to case and forces a confirm for every searched word.

■ Beyond the basics, there isn't a whole lot to *FriendlyWriter*, and its drawbacks are serious.

Beyond the basics, there isn't a whole lot to *FriendlyWriter*, and its drawbacks are serious. For example, while it will support a number of printers and character formats such as boldface, italic, and underline, these can only be implemented globally. No kidding. The print menu asks if you want to turn these features on or off for the entire document—certainly not the way to produce the most elegant letters. And while the file save feature allows a short comment line for each file, they are saved in a proprietary format so that you won't have a clue as to what's in them when looking at a DOS directory. In addition to its own file format, *FriendlyWriter* will import and export ASCII format.

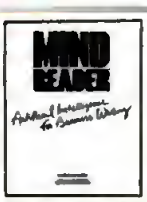
Overall, there is simply not much to praise about *FriendlyWriter*. While it is easy to use, there are just not enough features to allow serious writing, and at $89.95, the price is too steep for consideration as a notepad or executive letter writer. The program needs faster execution, more features, and a lower price if it is to compete in today's low-cost market, where full-featured, powerful products like *Volkswriter Deluxe Plus* are only $10 more.—**Jon Pepper**

MindReader

MindReader from BusinessSoft is a real anomaly: it's hard to figure out just what to make of it. On one hand, it has enough features—including some innovative artificial intelligence functions—to make even some of the most expensive word processors look like bare-bones products. On the other hand, the overall implementation and word processing functions make *MindReader* look and feel more like a computer game than a serious word processor.

I tried hard to like *MindReader*, but its disturbingly split personality made this a thankless task. The basic problem is that *MindReader* can't decide if it's a game or a business program. For example, when you first turn on the program, you get a screen that looks and sounds much like a computer game. Similarly, the predefined color sets have intriguing names like Key West, Hawaii, and Monte Carlo, and every on-screen action has an accompanying soundtrack that makes the bridge of the Starship *Enterprise* sound like a Zen monastery by comparison. Mercifully, the sound can be turned off.

PC MAGAZINE FACT FILE



MindReader
BusinessSoft Inc.
703 Giddings Ave.,
#M-4
Annapolis, MD 21401
(800) 843-6964
(301) 263-1962
List Price: $65

Requires: 256K RAM, two disk drives, DOS 2.0 or later.

In Short: A novel approach to word processing, which makes some claims to artificial intelligence. It can "customize" itself to your writing style but is limited as a word processor. Not copy protected.

CIRCLE 983 ON READER SERVICE CARD

Finally, a language worth

For years BASIC has been everyone's first language. And for almost as long, they've been tempted by other languages. Lured by promises of more speed, more power.

We have a solution. A new language that's a substantial improvement over BASICA. Faster. More structured. Finally, a compelling reason to leave BASIC.

Introducing Microsoft's QuickBASIC Compiler, Version 2.0.

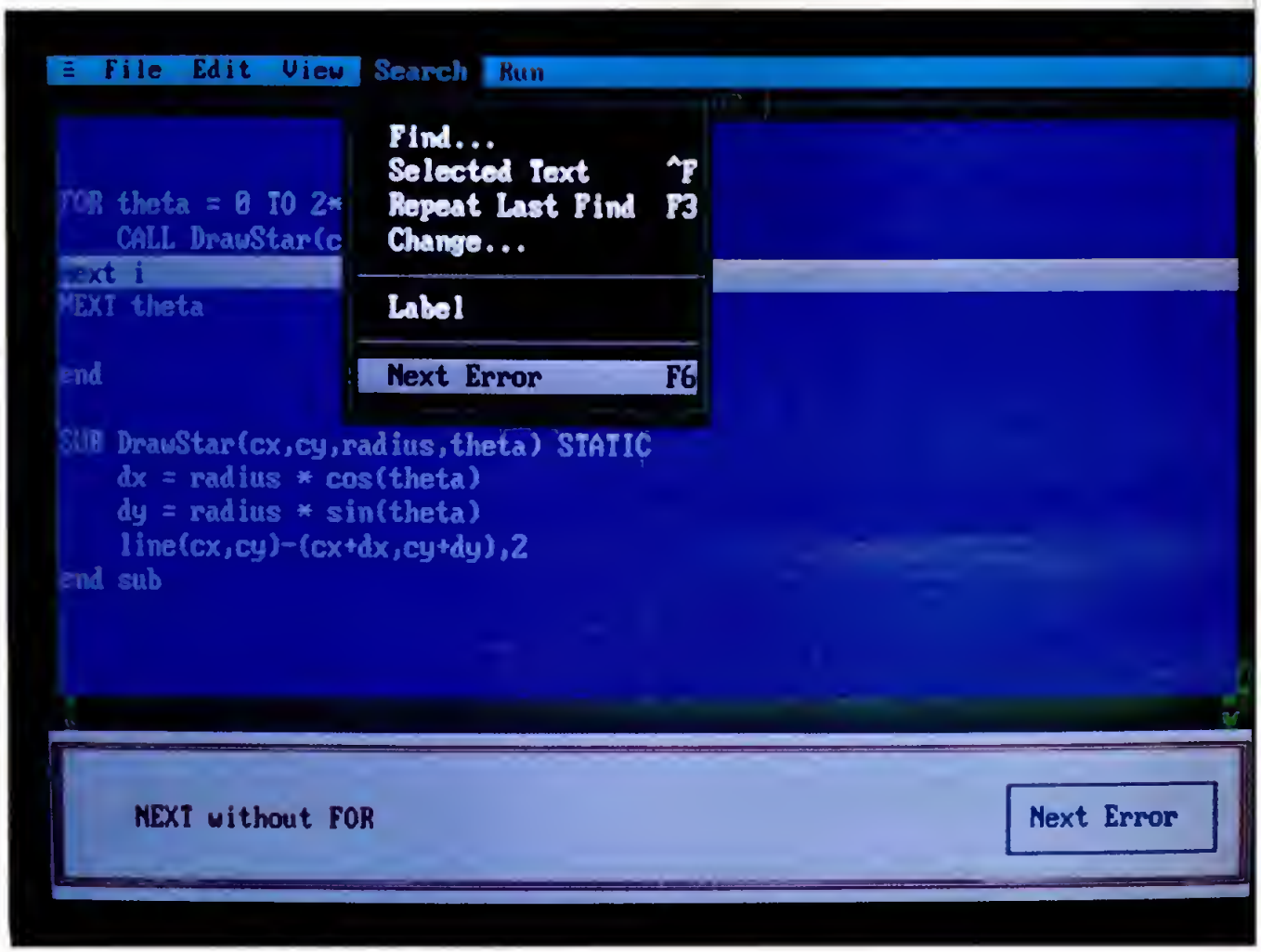
At last, you can have the latest programming techniques, combined with the solid foundation of BASIC. Our new compiler is as compatible with BASICA as you can get. At the same time it offers the extra speed and power you've been looking for.

Run faster with compiled code.

If there's one thing you've asked for, it's speed. And Microsoft® QuickBASIC simply blazes. Old BASICA programs will run up to ten times quicker once they've been compiled. Sometimes even faster.

Everything you need. Built-in.

Making programs run faster is only part of the story, though. The new Microsoft QuickBASIC Compiler includes a full-screen editor, built-in. So now you can make the jump from writing to RUNning in no time flat. Edit your program, compile it, and run it. Faster than any other BASIC compiler around. All without leaving our on-line help and prompts.



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leaving BASIC for.

On the rare chance your program doesn't run 100% the first time out, we've got another surprise for you. The Microsoft QuickBASIC debugger. Our full-screen tracing lets you debug your programs while watching the source code execute. A line at a time, or with breakpoints. As easy as can be.

Our compiler is also smart enough to save you time. First, by finding any errors in one pass. Second, by putting your editor's cursor on the problem. Automatically. So you don't have to get lost in a maze of error codes and line-numbers.

The BASIC virtues. And more.

Speaking of line numbers, let's not. Because line numbers are strictly optional. And Microsoft QuickBASIC lets you use alphanumeric labels as well. Now you can GOTO *ErrorCheck* instead of line number 6815.

Or you could stop using GOTOs altogether. There are a variety of options that could make the GOTO an endangered species. Features like multi-line IF-THEN blocks. And named subprograms. Now your BASIC programs can be as structured and organized as you want.

We've only just begun to talk about the virtues of Microsoft QuickBASIC. There are dozens of enhancements to your favorite language. Things like larger arrays. Local and global variables. Reusable modules that let you create libraries of your most often-used routines. All explained in a revised manual that includes a complete language reference.

Making your quick escape.

If all these features follow your BASIC instincts, then zip on down to your nearest Microsoft dealer. That's where you'll discover the best surprise of all. The price. Only $99 for the best reason to leave BASIC.

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Microsoft® QuickBASIC
The High Performance Software™

Microsoft QuickBASIC Compiler Version 2.0 for IBM® PC and Compatible Computers.

BASICA Compatibility
- Sound statements including SOUND and PLAY.
- Graphics statements including WINDOW, VIEW, DRAW, GET, PUT, LINE, CIRCLE, LOCATE and SCREEN.
- Support of EGA extended graphics modes. NEW!
- BASICA structures are supported including WHILE/WEND, IF/THEN/ELSE, FOR/NEXT, GOSUB/RETURN, and event handling.

Results of Sieve Benchmark	BASICA 3.1	Microsoft QuickBASIC 2.0
Seconds per iteration	78	0.52

Complete Programming Environment
- Built-in Editor that places the cursor on found errors automatically. NEW!
- Compile entirely in memory at speeds up to 6000 lines per minute. NEW!
- Link routines once when starting a programming session and no need to link again when changing programs. NEW!
- Built-in debugger with single-step, animate, and trace modes. NEW!
- Create stand-alone programs.

Alphanumeric Labels
- Can be used to make your programs more readable. Line numbers are not required but are supported for BASICA compatibility.

Structured Programming Support
- Block IF/THEN/ELSE/END IF eliminates the need for GOTO statements. NEW!
- Subprograms can be called by name and passed parameters. Both local and global variables are supported.

Modular Programming Support
- Separate compilation allows you to create compiled BASIC libraries to use and re-use your programs.
- A library of routines to access DOS and BIOS interrupts is supplied. NEW!

Large Program Support
- Code can use up to available memory.
- Numeric arrays, each up to 64K bytes, can use up to available memory. NEW!



CIRCLE 356 ON READER SERVICE CARD

Word Processing Programs: Summary of Features

Product/ Manufacturer	Price	Copy protection	Menu or command driven	On-line or book tutorial	Printed justification*	On-screen justification	Auto-indent	Double/triple on-screen spacing	Double/triple printed spacing	Character formats†	Manual tab settings	Headers and footers‡	Auto-pagination	Can disable auto-pagination	Manual pagination
GENERAL					**FORMATTING**							**PAGINATION**			
Cut and Paste Electronic Arts	$14.95	●	Both	On-line	L,C	○	●	○	D	None	○	SLH	●	●	○
PC-Write Quicksoft	shrewsre: $16.00 to register. $89.95	○	Menu	Book	L,R,C	●	●	○	D,T	B,I,U, SS,ST	●	SLH,SLF, MLH,MLF	●	●	●
Textra Ann Arbor Softwsre	$19.95	○	Menu	Both	L,R,C	●	●	D,T	D,T	B,I,U, SS,ST	●	SLH,SLF	●	●	●
Paperback Writer Paperback Softwsre International	$39.95	●	Menu	Book	L,R	●	○	○	D,T	B,U	●	None	●	●	●
Electric Pencil Electric Softwsre	$49.95	○	Command	Book	L,R,C	●	●	D,T	D,T	B,U	●	SLH,SLF, MLH,MLF	●	●	●
THE Wordprocessor Indian Ridge Enterprises	$49.95	○	Command	On-line	L,R,C	●	○	○	D	B,I,U,SS	○	SLH,SLF	●	○	●
My Word! TNT Softwsre	$59.00	○	Command	Book	L,R,C	○	○	○	D,T	B,I,U, SS,ST	●	SLH,SLF	○	○	●
MindReader BusinessSoft	$65.00	○	Menu	On-line	L,R,C	○	●	○	D,T	B,U,SS	●	SLH,SLF, MLH,MLF	○	○	○
Executive Writer Paperback Softwsre International	$69.95	●	Menu	Book	L,R,C	●	●	○	D	B,U,SS	●	SLH,SLF, MLH,MLF	●	○	○
FriendlyWriter with FriendlySpeller FriendlySoft	$89.95	○	Both	On-line	L,R,C	●	○	○	D	B,I,U	○	None	○	○	○
Easy Extra MicroPro International	$99.00	○	Menu	On-line	L,R,C	●	○	○	D,T	B,I,U, SS,ST	●	SLH,SLF	●	●	●
Volkswriter Deluxe Plus Lifetree Software	$99.00	○	Both	On-line	L,R,C	○	●	○	D,T	B,I,U, SS,ST	●	SLH,SLF, MLH,MLF	●	●	●
Bank Street Writer Plus Broderbund Software	$99.95	●	Both	On-line	L,R,C	●	●	○	D,T	B,U	●	SLH,SLF	●	●	○
PractiWord PractiCorp International	$99.95	○	Both	Book	L,R,C	●	●	○	D,T	B,U,SS	●	SLH,SLF	●	●	○
Executive Secretary V Glencoe Publishing	$104.80	○	Both	Book	L,R,C	○	●	○	D	B,U	●	SLF,MLH	●	○	●
Brown Bag Word Processor Brown Bag Software	$129.95	○	Menu	Book	L,R,C	●	●	○	D	B,I,U, SS,ST	●	SLH,SLF, MLH,MLF	●	●	●
Webster's New World Writer Simon & Schuster	$150.00	○	Both	Book	L,R,C	○	○	D,T	D	B,U	●	SLH,SLF, MLH	●	●	●
PFS:Professional Write Software Publishing Corp	$199.00	○	Both	Book	L,R,C	○	○	D	D	B,I,U,SS	●	SLH,SLF, MLH,MLF	●	●	●

Product/ Manufacturer	Cursor, page, and line no.	File name	Disk drive	Directory	Word	Line	Sentence	Paragraph	Page	Highlight or begin/ end marks	Move	Copy	Swap	Delete	Merge files	Holding area	Disk file	Auto or manual reformatting as block is relocated
STATUS LINE INFORMATION					**METHODS OF DELETION**					**BLOCK EDITING TOOLS**	**Blocked text actions:**					**Copies/ deletes to:**		
Cut and Paste Electronic Arts	○	●	○	○	○	○	○	○	○	Highlight	●	○	○	●	○	●	●	Auto
PC-Write Quicksoft	○	●	●	●	●	●	○	○	○	Highlight	●	●	●	●	●	○	○	Auto
Textra Ann Arbor Software	●	○	○	○	●	●	○	○	○	Highlight	●	●	○	○	●	○	●	Auto
Paperback Writer Paperback Softwsre International	○	●	●	○	●	●	●	●	●	Highlight	●	●	○	●	○	○	○	Manual
Electric Pencil Electric Softwsre	○§	○§	○§	○§	●	●	●	●	●	Marks	●	●	○	●	●	●	○	Auto
THE Wordprocesser Indian Ridge Enterprises	●	○	○	○	●	●	○	○	○	Highlight	●	●	○	●	●	●	○	None
My Word! TNT Softwsre	●	●	○	○	●	●	○	○	○	Highlight	●	●	○	●	●	○	○	Auto
MindReader BusinessSoft	●	●	●	○	●	●	○	○	○	Highlight	●	●	○	●	●	○	○	Manual
Executive Writer Paperback Software International	○	●	○	○	●	●	●	●	●	Highlight	●	●	○	●	○	●	○	Manual
FriendlyWriter with FriendlySpeller FriendlySoft	●	○	○	○	●	○	●	○	○	Highlight	○	○	○	○	○	○	○	None
Easy Extra MicroPro International	●	○	○	○	●	○	○	○	○	Highlight	●	●	○	●	●	●	○	Either
Volkswriter Deluxe Plus Lifetree Softwsre	●	●	●	●	●	●	○	○	○	Marks	●	●	●	●	○	●	○	Auto
Bank Street Writer Plus Broderbund Software	○	○	●	○	○	○	○	○	○	Highlight	●	●	○	●	●	○	○	Auto
PractiWord PractiCorp International	●	●	○	○	●	●	○	○	○	Highlight	●	●	○	●	●	○	●	Manual
Executive Secretary V Glencoe Publishing	○	○	○	○	●	●	○	○	○	Marks	●	●	○	●	●	○	●	Manual
Brown Bag Word Processor Brown Bag Software	○	●	●	●	●	●	○	○	○	Highlight	●	●	●	●	●	○	○	Auto
Webster's New World Writer Simon & Schuster	●	●	○	○	●	●	○	○	○	Highlight	●	●	○	●	○	●	●	Manual
PFS:Professional Write Software Publishing Corp	●	●	○	○	●	●	○	○	○	Highlight	●	●	○	●	●	●	●	Auto

"•" —Indicates Editor's Choice ●—Yes ○—No *L—Left, R—Right, C—Center †B—Bold, I—Italic, U—Underline, SS—Sub- and superscripts, ST—Strikethrough, ‡SLH—Single-line header, SLF—single-line footer, MLH—Multiple-line header, MLF—Multiple-line footer §*Electric Pencil* reports status through the menu system. ||Supports printers by means of manual

(continues)

Product/ Manufacturer	CURSOR MOVEMENT: Cursor to end of document	Start of document to cursor	Moves to next/previous: Word	Line	Sentence	Screen	Page	Moves to beginning/end of: Page	Document	Jumps cursor to specific: Line	Page	Marker	Scroll lock
Cut and Paste Electronic Arts	○	○	○	●	○	●	○	○	●	○	○	○	○
PC-Write Quicksoft	●	●	●	●	●	●	●	○	○	●	●	●	●
Textra Ann Arbor Software	○	○	●	●	○	●	○	●	●	●	●	●	○
Paperback Writer Paperback Software International	●	●	●	●	○	●	○	○	●	○	○	○	○
Electric Pencil Electric Software	●	●	●	●	●	●	○	●	●	○	○	●	○
THE Wordprocessor Indian Ridge Enterprises	○	○	●	●	●	●	○	○	○	○	○	○	○
My Word! TNT Software	○	○	●	●	○	●	○	○	○	○	○	○	○
MindReader BusinessSoft	○	○	●	●	○	○	○	○	○	○	○	○	○
Executive Writer Paperback Software International	○	○	●	●	○	●	○	○	○	○	○	○	●
FriendlyWriter with FriendlySpeller FriendlySoft	○	○	○	●	○	●	●	○	○	○	○	○	○
Easy Extra MicroPro International	○	○	○	●	○	●	○	○	○	○	○	○	○
Volkswriter Deluxe Plus Lifetree Software	○	○	●	●	○	●	●	○	○	●	●	●	○
Bank Street Writer Plus Broderbund Software	○	○	●	●	○	●	○	○	○	○	○	○	○
PractiWord PractiCorp International	○	○	●	●	○	●	○	●	●	●	●	●	○
Executive Secretary V Glencoe Publishing	○	○	●	●	○	○	○	○	○	●	○	●	○
Brown Bag Word Processor Brown Bag Software	●	●	●	●	●	●	●	○	○	●	●	●	●
Webster's New World Writer Simon & Schuster	●	○	●	●	○	●	●	○	●	●	●	●	●
PFS:Professional Write Software Publishing Corp	○	○	●	●	○	●	○	○	●	○	○	○	○

Product/ Manufacturer	SEARCH AND REPLACE: Forward	Backward	Case sensitive or insensitive	Whole word	Any string	Searches for wildcards	Searches for format codes	Replaces with verify	Replaces without verify	PRINTER SUPPORT: Epson	IBM Graphics	Diablo	HP Laserjet	Chains documents for printing	Maximum file size
Cut and Paste Electronic Arts	○	○	No S/R	○	○	○	○	○	○	●\|\|	●\|\|	●\|\|	●\|\|	○	Disk size
PC-Write Quicksoft	●	●	Sensitive	●	●	●	●	●	●	●	●	●	●	●	60K
Textra Ann Arbor Software	●	●	Sensitive	●	●	○	○	●	●	●\|\|	●\|\|	●\|\|	●\|\|	○	60K
Paperback Writer Paperback Software International	●	○	Sensitive	●	●	○	●	●	●	●	○	○	○	○	Disk size
Electric Pencil Electric Software	●	●	Sensitive	●	●	●	●	●	●	●	●	●	●	●	63,328 chars
THE Wordprocessor Indian Ridge Enterprises	●	○	Sensitive	○	○	○	○	●	●	●	●	●	○	○	Disk size
My Word! TNT Software	●	○	Sensitive	●	●	○	●	●	●	●	●	●	●	●	128K approx
MindReader BusinessSoft	●	○	Sensitive	●	○	○	○	●	○	●	○	○	○	○	Disk size
Executive Writer Paperback Software International	●	○	Sensitive	●	●	●	●	●	○	●	●	○	○	○	Disk size
FriendlyWriter with FriendlySpeller FriendlySoft	●	●	Insensitive	●	●	○	○	●	○	●	●	●	●	○	Up to RAM
Easy Extra MicroPro International	●	○	Sensitive	●	○	○	○	●	●	●	●	●	●	○	Disk size
Volkswriter Deluxe Plus Lifetree Software	●	○	Insensitive	○	○	●	○	○	○	●	●	●	●	○	Disk size
Bank Street Writer Plus Broderbund Software	●	○	Sensitive	●	○	○	○	●	○	●	●	○	○	○	Disk size
PractiWord PractiCorp International	●	●	Sensitive	●	●	○	○	●	●	●	○	●	●	●	Disk size
Executive Secretary V Glencoe Publishing	●	○	Sensitive	●	●	○	●	○	●	●	○	○	○	●	2 500 words
Brown Bag Word Processor Brown Bag Software	●	●	Sensitive	●	●	●	●	●	●	●	●	●	●	●	60K
Webster's New World Writer Simon & Schuster	●	●	Sensitive	●	●	●	●	●	●	●	●	●	●	○	Disk size
PFS:Professional Write Software Publishing Corp	●	○	Insensitive	●	●	●	○	●	●	●	●	●	●	●	32 pages

configuration only. Note: All the word processors set margins, feature automatic word wrap, and, with the exception of *Executive Secretary V*, toggle between insert and overstrike modes.

Word Processing Programs: Summary of Features (continued)

Product/ Manufacturer	UNDO UTILITY: Undoes last delete	UNDO UTILITY: Undoes last edit action	BACKUP: Auto-backup	BACKUP: Can disable backup	BACKUP: Auto-save during edit	DOS FACILITIES: Exits without saving	DOS FACILITIES: File dir. accessible from edit menu	DOS FACILITIES: Changes default drive	DOS FACILITIES: Accesses file from other drive	DOS FACILITIES: Changes default directory	DOS FACILITIES: Accesses file from other directory	DOS FACILITIES: Imports ASCII	DOS FACILITIES: Imports other formats#	DOS FACILITIES: Exports ASCII	DOS FACILITIES: Exports other formats
Cut and Paste Electronic Arts	○	○	○	○	○	●	●	●	●	○	○	○	○	○	○
PC-Write Quicksoft	●	●	○	○	○	○	○	●	●	●	●	●	○	●	○
Textra Ann Arbor Software	●	○	●	●	●	●	●	●	●	●	●	●	○	●	○
Paperback Writer Paperback Software International	●	○	○	○	○	●	●	○	●	○	○	●	○	○	○
Electric Pencil Electric Software	●	○	●	●	●	●	●	●	●	●	●	●	○	●	○
THE Wordprocessor Indian Ridge Enterprises	●	○	○	○	○	●	●	●	●	○	○	●	○	●	○
My Word! TNT Software	○	○	○	○	○	○	○	●	●	●	●	○	WS	○	○
MindReader BusinessSoft	●	○	○	○	●	○	●	●	●	○	○	●	○	●	○
Executive Writer Paperback Software International	○	○	●	○	○	●	●	●	●	●	○	●	○	●	○
FriendlyWriter with FriendlySpeller FriendlySoft	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Easy Extra MicroPro International	●	○	●	○	●	●	●	●	○	●	●	○	WS	○	WS
Volkswriter Deluxe Plus Lifetree Software	○	○	●	●	○	○	○	●	●	○	○	●	DCA, WS, L, DB	●	DCA, WS, L, DB
Bank Street Writer Plus Broderbund Software	●	○	○	○	○	●	●	●	○	●	○	●	○	●	○
PractiWord PractiCorp International	○	○	●	●	●	●	●	●	●	●	●	●	○	●	○
Executive Secretary V Glencoe Publishing	○	○	○	○	○	●	○	○	○	○	○	●	○	●	○
Brown Bag Word Processor Brown Bag Software	●	●	○	○	○	○	○	●	●	●	●	●	○	●	○
Webster's New World Writer Simon & Schuster	●	○	○	○	Optional	●	●	●	●	●	●	●	○	●	○
PFS Professional Write Software Publishing Corp	○	○	○	○	○	●	○	●	●	●	●	●	DCA	●	DCA

Product/ Manufacturer	OTHER FEATURES: Footnotes	Spelling checker	Thesaurus	Mail-merge	Auto index generator	Table of contents generator	Style sheets	Keyboard macros	Customizes color screen	Date variable	Time variable	Draw mode	Simple math	Hyphens	Foreign language	Scientific notation
Cut and Paste Electronic Arts	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
PC-Write Quicksoft	●	●	○	●	●	●	●	●	●	●	●	●	○	○	●	●
Textra Ann Arbor Software	○	○	○	○	○	○	○	○	●	○	○	●	○	○	○	○
Paperback Writer Paperback Software International	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Electric Pencil Electric Software	●	●	○	○	○	○	○	●	●	○	○	●	○	●	●	○
THE Wordprocessor Indian Ridge Enterprises	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
My Word! TNT Software	○	●	○	●	○	●	○	●	●	●	○	●	●	○	●	●
MindReader BusinessSoft	●	●	○	●	○	○	○	●	●	○	○	●	●	○	●	●
Executive Writer Paperback Software International	●	○	○	○	○	●	○	●	○	○	○	●	○	○	○	○
FriendlyWriter with FriendlySpeller FriendlySoft	○	●	○	○	○	○	○	●	○	○	○	○	○	○	○	○
Easy Extra MicroPro International	●	●	○	●	○	○	○	○	○	○	○	○	○	○	●	○
Volkswriter Deluxe Plus Lifetree Software	●	●	○	●	○	○	○	○	●	○	○	○	○	○	●	●
Bank Street Writer Plus Broderbund Software	●	●	○	○	○	○	○	○	○	○	○	○	●	○	○	○
PractiWord PractiCorp International	○	○	○	●	●	●	○	●	●	○	○	○	○	●	●	○
Executive Secretary V Glencoe Publishing	○	●	○	●	○	○	○	○	○	○	○	○	○	○	○	○
Brown Bag Word Processor Brown Bag Software	●	●	○	●	●	●	●	●	●	●	●	●	○	○	●	●
Webster's New World Writer Simon & Schuster	○	●	●	○	○	○	●	○	●	●	○	●	○	○	●	○
PFS:Professional Write Software Publishing Corp	○	●	●	●	○	○	○	●	●	○	○	●	○	○	○	○

—Indicates Editor's Choice ●—Yes ○—No #DCA—Document Content Architecture, WS—Wordstar, L—Lotus's *1-2-3*, DB—*dBASE*. Note. All the word processors set margins, feature automatic word wrap, and, with the exception of *Executive Secretary V*, toggle between insert and overstrike modes



One of MindReader*'s most useful functions is its pop-up Rolodex. The program offers other unlikely extras as well, including simple math and draw capabilities.*

ARTIFICIAL INTELLIGENCE The good news about *MindReader* is the serious effort made toward implementing some modicum of artificial intelligence. The bad news is that word processors with AI features are still more of a novelty than a useful tool. There is a ton of so-called AI features in *MindReader*, most notably Word Complete and AI Learn.

Word Complete offers choices that can complete words with a single keystroke. For example, if you type the word *type*, the program will offer *typed* and *typewriter* as options to complete the word. With the program's AI Learn feature turned on, the program actually becomes customized to your writing style. AI Learn will "notice" what words you use and how often and will then offer your most frequently used words first from the Word Complete choices.

Other AI features include single-key completion of suffixes, plurals, -ing, and past tense for words. Type F3 (-ing) and *play* becomes *playing*, or press F4 (past) and *play* becomes *played*.

The problem with the AI implementation is that it doesn't quite make it for fast typists. Although you can adjust the program to your typing speed somewhat, all but the slowest typists will find the Word Complete feature to be an interference. However, the function-key completions of suffixes, and the stored glossary of frequently used words and phrases can be quite useful for repetitive documents.

Also on the plus side, *MindReader* is remarkably easy to learn and use. The screen shows the function keys and their assignments (in combination with Alt and Shift) along the top and bottom of the screen, and submenus pop up as necessary. It is entirely possible to work through the program without referencing the manual or the on-line tutorial.

MindReader also offers a ton of nice features. A set of desk accessories includes math functions, a diary, a calendar, a Rolodex, line draw capability, and even a built-in word game, which is quite entertaining. All of these add-ons are a lot of fun, but there are too many others to mention every one in this limited space.

So what's the problem? Unfortunately, the basic word processing functions don't work that well. *MindReader* defaults to overstrike mode, and pressing Ins causes the text to distractingly drop away, as in *MultiMate*. Block moves are cumbersome, and what's worse, it's impossible to start a block anywhere but at the beginning of a line.

Also, there are no page breaks on-screen, and resetting your margins has no effect on the on-screen look of the document. *MindReader* saves documents in a proprietary format, and importing and exporting ASCII files is possible but nettlesome.

Ultimately, *MindReader* is an admirable experiment that just doesn't work as a serious business tool. Despite the novelty of the AI functions, and the rich range of features, the basic word processing implementation is just too weak to make this a worthwhile word processor. If the AI features were wrapped around a stronger basic shell, the program could have a chance, and future releases could potentially make good on some of the promise that *MindReader* has. As it is, you're being asked to invest $65 to see some of the potential of AI. **—Jon Pepper**

My Word!

My Word! from TNT Software is a word processor that proves there is still life left for *WordStar*-type programs. The product is unabashedly modeled on *WordStar*, and yet, rather than looking like an imitator, *My Word!* comes off as superior in a number of areas, particularly performance and price. If you are a *WordStar* fan, this is certainly a product worth looking into.

In fact, anyone who has used *WordStar*

PC MAGAZINE FACT FILE



My Word!
TNT Software Inc.
34069 Hainesville Rd.
Round Lake, IL 60073
(312) 223-8595
List Price: $59; with spelling checker, $69; with automatic document indexer, $99.
Requires: 256K RAM, one disk drive, DOS 2.0 or later.
In Short: A low-price, high-quality *WordStar*-like word processor. Not copy protected.

CIRCLE 669 ON READER SERVICE CARD

The TOP 10 Reasons

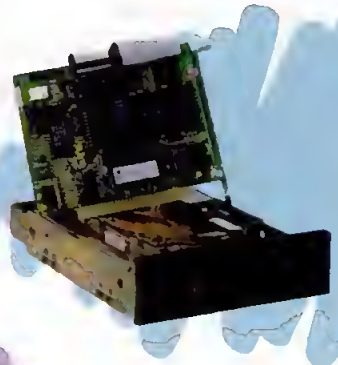
Reason #1) REALLY Nice People! -- Well, yas tha Qubie' staff ara nice people, but they ara also seasoned professionals. Our courteous Selas/Customer Service Oepartmant is staffed with people who cen answer any question befora you buy and take your order. Our top-notch Technical Support Oepertmant (working hours, **M - F 8am - 5pm PTZ, and Sat. 8 11am PTZ**) are as close as e phone call and can answer your questions after you buy. The staff of Qubie' knows it tekes excellent service and tech-support to keep customers satisfied.

Reason #2) REALLY Good Products! -- Yes, Qubie' products are of the highest quality, but you don't have to taka our word for it, our exclusive **30-Day No Risk Guarantee** speeks for itself -- if for any reeson you ere not completely satisfied with your purchase, you may return it within 30 days of purchase, for a complete refund, including the cost to send it back. Qubie' also offers e **one year warranty**, and **48-hour turnaround** and **Federal Express** on werranty repairs. The steff of Qubie' knows that customers want the best products et the lowest price.

Reeson #3) Recommended By Several World Leeders -Well, perhaps not WORLD leeders, but Qubie' customars ARE leeders in the business community -corporetions such es Exxon, General Motors, Rockwell and IBM, to neme e few, buy peripherel equipment from Qubie' and have been for yeers; we've been pleesing PC owners since 1982.

So, please read on for reasons 4-10 and **DISCOVER** for yourself what others have known for so long -- Qubie' MEANS reelly nice people end reelly good products (et reelly low prices!)

Thank You



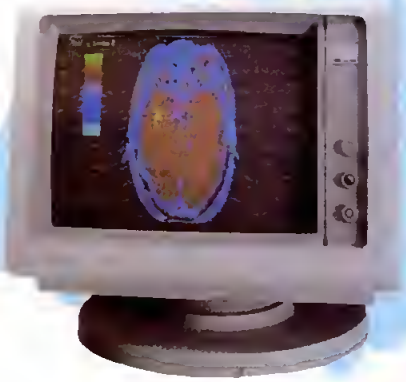
HARD SOLUTIONS

The PC20 is an internal hard disk subsystem mounted like your floppy that sells for an unbelievable **$369!** The PC20 drive boots directly from the herd disk and does not require softwara patches. Also included is software that truly enhances the use of your hard disk -- 1dir, the hard disk orgenizer that makes DOS a snap, and the special Qubie' version of ZyINDEX, the super searchar.



TRUE COLORS

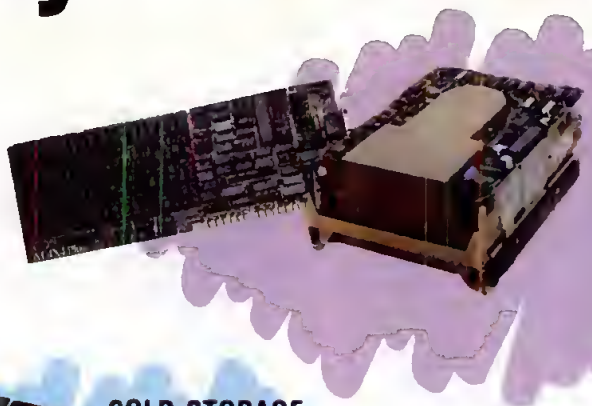
Qubie' shows you thair true colors with their fully compatible 256K EGA card with e parallel port that sells for only **$219**. One board that does monochrome 640x350 bit mapped graphics and text, and provides a clear upgrade path to 640x350 Enhenced Color Display with no change of display board. It elso runs with the 640x200, 320x200 Color Display. In addition to 256K of memory and a parallel printer port, the boards come stendard with 16 simulteneous colors displayed from a palette of 64 colors.



TRUE COLORS, PART II

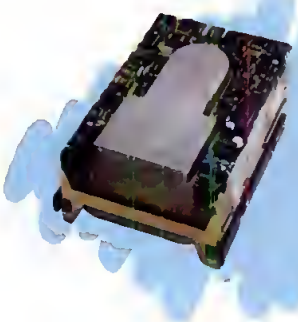
Of course meny of you will want to taka edventege of the EGA card right away, so we are also offering e speciel "Display Deal" -- the EGA board together with tha Basic Time HR31-350 monitor, for only **$649**. We mentioned the EGA feetures above; the Basic Time HR31-350 monitor features 640x350 resolution, full 14" RGB picture with .31mm dot pitch, and e tilt/swivel base.

To Buy From Qubie'



THE GREAT EXPANSE

Turn your AT into tha ultimate power-house with a Qubie' ATKit for as little as $939! Your AT is no toy; a powerful AT needs a hard disk with the capacity and the spead to supply data fast. Our BT42 hard drive has a formatted capacity of 42 megabytas and 40 msec. accass tima. Also included is tha "Dreamboard" -- tha AT4X4Plus. It has up to 4 magabytas of RAM available, a parallal and serial port standard, with 3 mora serial ports optional.



COLD STORAGE

With the BT30, a 30 magabyte drive for your AT priced at **$649**, high raliability is assured through the use of LSI. The haad positioning system employs a dedicated surfaca closed-loop servo and also a linear voice-coil actuator. The heads are autometically positioned and locked over the dadicated head shipping zone at power-down; average access tima is 40 msec. We also offer BT40's and up starting at **$739**.



TALKS CHEAP

1200 baud Intarnal and Extarnal Modems for only $119! Both units ara Hayes 'AT" command set compatibla, include a Modular Phone Cord, and PC-TALK III softwere. Both units ara designed specifically for the IBM PC, PC XT, AT, and most compatibles. The internal modem occupies one full length slot. Our external standelone modam can be used with any computer which utilizas an RS-232C sarial port.



TALKS CHEAP, VERSION II

2400 baud internal and extarnal modems at an incredible **$229**. Thesa stata-of-the-art modems are CCITT V.22/V.22 bis, Ball 212A Compatible, and 2400/1200/600/300/110 bps. Both units are fully compatible with all Hayes software commands. The 2400I Internal Modem Card fits into any axpansion slot, as it is a compact half-card modem. The 2400E External Modem offers the user asynchronous or synchronous communications.

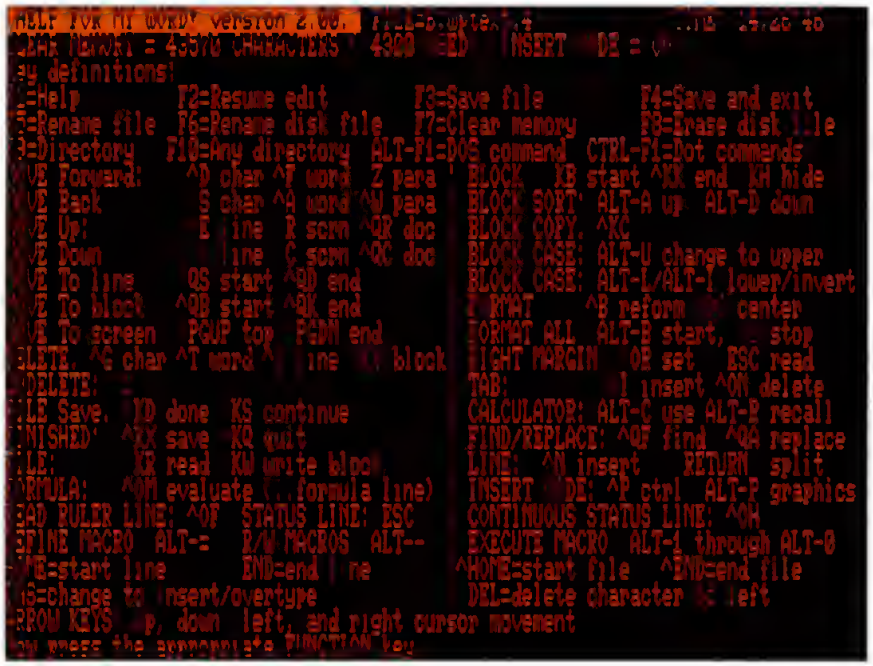
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CIRCLE 236 ON READER SERVICE CARD



TNT Software's My Word!, *one of the two* WordStar *lookalikes in this group of word processing programs, gives you a useful help screen that includes the time, a report on the current amount of available memory, and a summary of cursor movements and block editing commands.*

should feel right at home with *My Word!* because it uses the basic *WordStar* command structure of Ctrl-key and dot commands. *My Word!* also adds a number of Alt-key commands and takes full advantage of the ten function keys.

My Word! comes in three versions: the basic program ($59), with the spelling checker ($69), and with the document indexer ($99). The version tested had the spelling checker and came on two disks.

Installation is straightforward, and using the program is quite easy, though with some qualifications. Although *My Word!* has a few menus, it is basically command driven, especially once you are into creating or editing a document. So if you need the comfort of constant prompts and reassuring menus, you might be a bit put off by *My Word!* However, the program is not difficult and is worth the effort to learn.

DOWN TO BUSINESS *My Word!* offers no fancy screens, pull-down menus, or other assorted amenities so often found in easy-to-use products. Rather, it has a utilitarian, spartan approach that is almost refreshing. The manual is direct and extremely well written, especially some engaging descriptions that really bring life to technical subjects like printer configuration. A tutorial section in the manual will painlessly guide you through most of *My Word!*'s features.

The opening screen menu offers a number of options for creating, editing, checking spelling, and other manipulations, but once you are into the document you are on your own and away from the comfort—or distraction—of menus. Hitting F1 will bring up a help screen listing commands, and a quick-reference card that summarizes all the commands is provided. New users will probably want to keep the card close at hand.

The *My Word!* screen is basically a blank page, and you can enter text with either overstrike or insert as your default mode. *My Word!* has a fast editor and performs well on search-and-replace functions and screen moves. For an inexpensive product, *My Word!* has more than its share of interesting capabilities. Besides virtually every major print, screen, and editing tool necessary for writing, the program offers a number of macro and math enhancements that some users will find very appealing.

The macro capability is quite powerful, and macros can be invoked either at startup or at any time during editing. The program also contains a full-function calculator, a formula-evaluation function (that will evaluate math formulas and put the answer in a stack in the calculator), and both sort and merge print capabilities. There is also conditional logic that, when used with the other capabilities, can produce some interesting results. For example, *My Word!* has the ability to produce monthly mailings of invoices to clients, calculating the interest due to overdue accounts and automatically adding it to the printed results. Admittedly, it will take a bit of doing to utilize the capability, but it is not beyond the reach of the dedicated user.

While the program is generally excellent, there are a few drawbacks. The on-screen appearance will not please WYSIWYG fans, and page breaks don't show on-screen. Also, while you can hit Esc to bring up a helpful status line at the bottom of the screen, it doesn't continuously update. You must hit Esc each time you want to find out what line you are on. And the spelling checker, while effective, doesn't offer alternate spellings for words—it simply flags mistakes and you must enter the correct spelling. Finally, the program is limited to editing files of about 48,000 characters at a time. While you can obviously create larger documents by chaining files (the *My Word!* manual was created and printed using the product), this is a potentially inconvenient drawback.

Overall, though, *My Word!* is a fine product. If you know *WordStar*, then you know how *My Word!* looks and feels, but with *My Word!* you also get low price, unique features, and superior performance. Fans of *WordStar*-type word processors should be quite happy with *My Word!* —**Jon Pepper**

Paperback Writer

Paperback Writer, available from Paperback Software International (the maker of *VP-Planner*), is a word processor made for rank beginners. *Paperback Writer* is a subset of *Executive Writer* (reviewed in this article), and it has few features other than

"Blessed are the Pessimists; for they hath made backups."

— Exasperated 1:16

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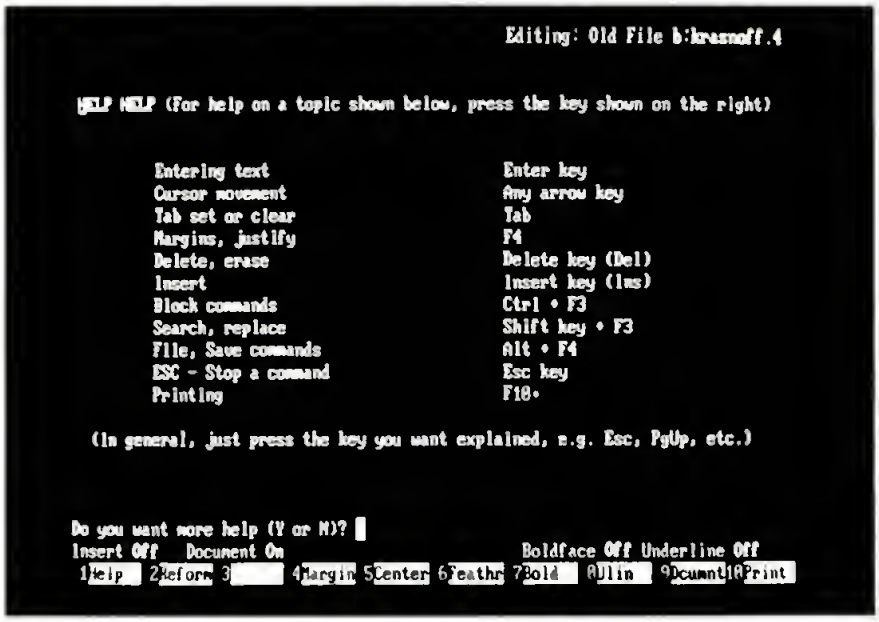
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CIRCLE 225 ON READER SERVICE CARD



Paperback Writer *is a less powerful incarnation of* Executive Writer *designed for the novice. This menu is shared by* Executive Writer, *and the editing screens are identical.*

the basic ability to create and print a document.

Primarily menu driven, *Paperback Writer* displays the easily obtainable function key commands at the bottom of the screen. Twenty-six functions are available in total, which include nine standard function keys, four Shift-function, eight Ctrl-function, and five Alt-function combinations. By pressing the initial combination key, Shift, Ctrl, or Alt, you can see the different key assignments displayed on the last line of the monitor.

PC MAGAZINE FACT FILE



Paperback Writer
Paperback Software International
2612 8th St
Berkeley, CA 94710
(415) 644-2116
List Price: $39.95
Requires: 128K RAM, one disk drive, DOS 2.0 or later.
In Short: A limited package for beginners; a subset of Paperback Software's *Executive Writer*. Copy protected

CIRCLE 686 ON READER SERVICE CARD

The welcoming screen in *Paperback Writer* is simple; there are three menu choices: Directory, Editor, and Quit. Choosing Directory will display all the files in the current directory, while Editor will prompt you to enter the file you wish to edit. If you want to use a file that is in the current directory, you must remember the name and then enter it at the prompt; you cannot pick it from the directory, making file retrieval inconvenient and cumbersome.

Once the text screen is displayed, you can see the name of the file you are editing at the top, and on the bottom is a rule showing the adjustable tab stops. A status line below the rule indicates the default settings: insert off, boldface, and underline off (the only other text formats available) and document on. Document off means straight ASCII without any formatting codes. The available menu choices are displayed on the last line, with multilevel help located at the F1 key.

All text editing is managed through the function keys. On-screen formatting, including reformatting, setting margins, centering single lines, and turning boldface and underline on or off, is controlled with the standard function keys. Moving, copying, and deleting text is done with Ctrl-key combinations. One handy feature is the ability to recall the most recently deleted word, line, or block. Shift-key selections handle search-and-replace tasks, and although the arrangement is not very sophisticated, you can find and replace control codes.

With *Paperback Writer* you are able to create and print documents, but it is within a no-frills environment and has a number of shortcomings. First, it is copy protected. The manufacturer says an unprotected version is available for an extra $10, but the only way to find out is by calling; there is no other reference in the documentation. Second, there is no color customization. Nowadays color support is standard, even for inexpensive packages. Third, it is slow. Document size is limited only by RAM, but scrolling through a document is painfully slow. Fourth, there is no spelling checker or thesaurus available.

Paperback Writer is a limited piece of software that offers little room for either improvement or growth. I would hate to have to write my first paperback using such a confining word processor.

—Christopher Barr

PC-Write

The shareware concept has produced some really remarkable products, and Quicksoft's *PC-Write* is one of the best. After three years of release and revision, the latest version, *PC-Write*, Version 2.7,

PC MAGAZINE FACT FILE



PC-Write
Quicksoft
219 1st Ave. North, #244
Seattle, WA 98109
(206) 282-0452
List Price: Shareware, $16; with registration, $89.95.
Requires: 256K RAM (384K RAM with spelling checker), one disk drive, DOS 2.0 or later.
In Short: A feature-laden, unadorned word processing program that offers power and speed. Not copy protected.

CIRCLE 697 ON READER SERVICE CARD



PROBLEM: The more experience your hard disk has, the harder it has to work.

THE SOFTLOGIC SOLUTION: Disk Optimizer™

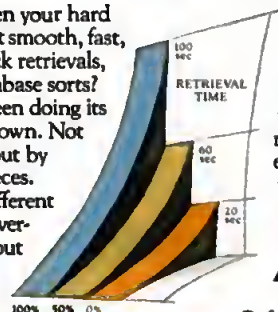
Your hard disk will run faster when it's not chasing around after files.

Remember the old days when your hard drive was new? Remember that smooth, fast, slick performance? Those quick retrievals, rapid saves, lightning-like database sorts?

Well ever since, DOS has been doing its best to slow your hard drive down. Not by slowing down the motor, but by breaking your files up into pieces. Storing different chunks in different places. Data files, programs, overlays and batches that started out in one seamless piece are now scattered all over.

Loading is slower. Sorting is slower. Retrieving, backing-up. Everything takes longer because your disk has to work harder.

Problem is, it's something that happens so gradually you may not notice the difference. At least, not until you see the dramatic improvement after using Disk Optimizer.



The more fragmented your files get, the longer they take to retrieve

File fragmentation—It's a problem you can see.

Watch your hard drive the next time it reads or writes a file. Each "blip" of the LED means the drive-head is moving to another place on the disk—either to pick up or lay down another chunk of data.

And the truth is, head movement takes time. Far more time than actual reading and writing. What's worse, all this head movement causes extra wear and tear that can shorten the life of your drive.

Disk Optimizer—Tunes up your disk by cleaning up your files.

Disk Optimizer works by finding all the scattered pieces of your files and putting them back together where they belong. Next time your drive reads it, there's just one place to look.

And the results are often dramatic. Reading and writing times may be cut by as much as two thirds. Database sorts that used to take hundreds of head moves now proceed quickly and efficiently. And since head movement is now at an absolute minimum, your disk drive will lead a longer, more productive life.

Analyze, scrutinize, optimize.

Before you optimize, you'll probably want to analyze. So Disk Optimizer shows you, in percentages, how much fragmentation has taken place—on the entire disk, in individual directories, or for groups of files you specify using global or wildcard names.

Plus, there's built-in data security that lets you assign passwords to as many files or file groups as you want.

And the File Peeker gives you an inside look at the structure of files. It's a great way for non-programmers to learn more about computers, and a powerful tool for professionals who want to analyze the contents of their disks.

Get your hard drive back in shape—at a special low price.

When you think about it, it's simple. The longer you own your hard drive, the more you come to depend on it. But the longer you wait to get Disk Optimizer, the less performance you'll have.

And the less chance you'll have to buy Disk Optimizer at the special introductory price of just $49.95*.

That's a small price to pay to get back the speed you depend on. But it's a price that won't last long.

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Or order today by calling SoftLogic Solutions at 800-272-9900 (603-627-9900 in NH), or send the coupon below.

Special combination pricing is available when you buy Disk Optimizer along with other SoftLogic products like DoubleDOS, Software Carousel and Cubit.

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Disk Optimizer $49.95*

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CIRCLE 334 ON READER SERVICE CARD



PC-Write, *the shareware program that has a screen presentation identical to that of* Brown Bag Word Processor, *displays an informative status line and has two sets of function-key commands, the second summoned by the Shift key.*

is crammed with powerful features.

PC-Write is known for its utilitarian approach to word processing. The developers waste no time on fancy opening-screen dissolves or other adornments. Instead, *PC-Write* offers power—often with more than one way to accomplish most common tasks—and speed.

The cryptic status line at the top of the screen delivers everything you'll want to know about the program's current operating mode. If you like, the next two lines can list the special keys you can use to execute commands.

To navigate within a document or mark text, you can use either combinations of cursor keys and special keys or *WordStar* Ctrl-key commands. To format text, you can use a very extensive array of embedded guidelines or add formatting information to the ruler line. When you ask for a count of a text block, the program delivers not only the number of words, but also bytes used, number of characters and letters, and even the average number of characters per word.

In fact, *PC-Write*'s features compare well against even some of the best professional word processors. You get keystroke recording, split-screen editing, and date or time insertion in a variety of formats. *PC-Write*'s merge facility is flexible and can even delete a line if a field is empty. You can specify page layout in printed inches, centimeters, sixths, picas, or variable units and use an extended file directory that gives you space to write short notes about each file. *PC-Write* automatically numbers footnotes or pages, generates an index or table of contents easily, and can automatically remind you to save your file after a specified number of characters typed or minutes passed.

PC-Write provides complete support of over 300 printers, including complete control of a number of laser printers with multiple fonts. It even supports Adobe's PostScript.

New in Version 2.7 is a 50,000-word, RAM-resident dictionary and spelling checker that can check words as you type. Also new: a "screen clip" utility for capturing and importing text screens from other programs you've run from within *PC-Write*.

Version 2.55 allowed only one active ruler line within a document. In the current version, you can now embed ruler lines anywhere within a file and easily recall format settings by pulling ruler lines in from separate control files. You still cannot insert tabs in a document, though.

The other significant drawbacks are a maximum document length of 60K bytes of RAM (you'll have to split longer documents) and its inability to let you edit while a document is printing.

Quicksoft encourages users to share copies of the program with their friends and associates. The company makes its money selling a complete 336-page manual and a quick reference and cards.

Even though the manual is a model of clarity and completeness and runs from "What is a Computer?" to advanced keyboard reassignment, *PC-Write* might not be the ideal first word processor for everybody. Instead, you might want to start with a program that has full on-screen WYSIWYG and context-sensitive help. Otherwise, *PC Write*, with its continuing revisions, may be the only word processor you'll ever need.—**Stephen Sagman**

PFS:Professional Write

The new *PFS:Professional Write* from Software Publishing Corp. is a beefed-up version of *PFS:Write*, including many features that users of the older program have longed for, such as greater control over line spacing, margins, block operations,

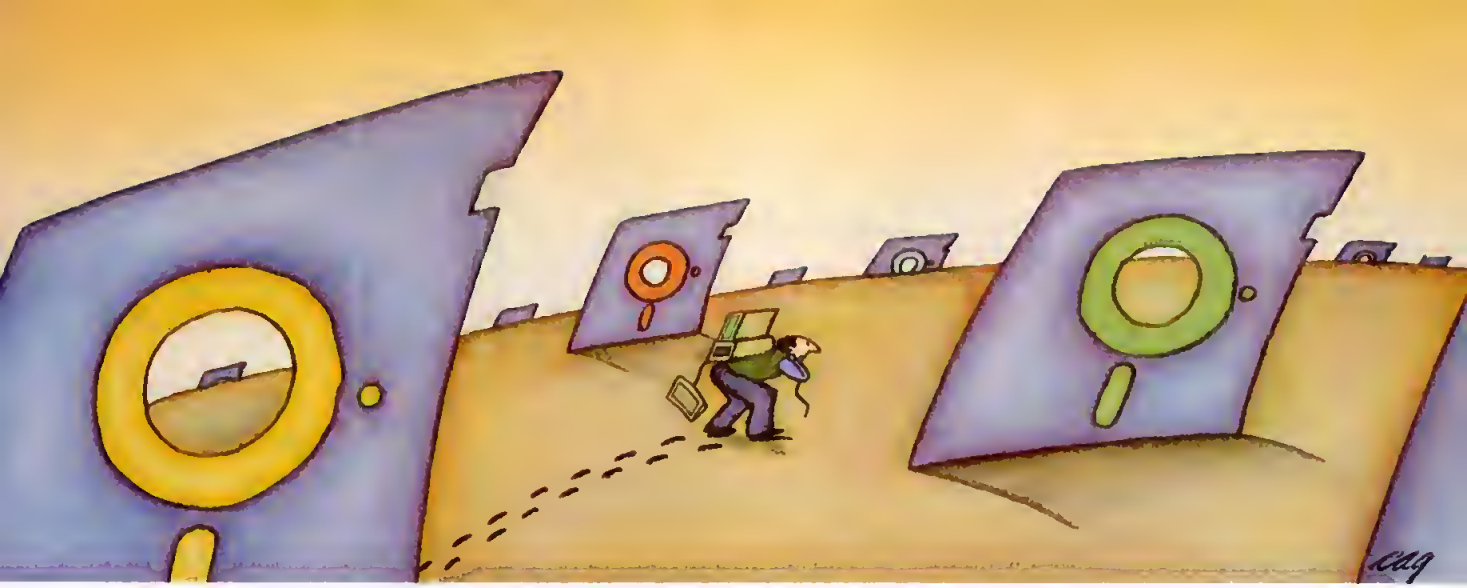
PC MAGAZINE FACT FILE



PFS: Professional Write
Software Publishing Corp.
P.O. Box 7210
1901 Landings Dr.
Mountain View, CA 94039
(415) 962-8910

List Price: $199
Requires: 320K RAM, two disk drives, DOS 2.0 or later.
In Short: This new evolution of *PFS:Write* retains simplicity but adds power features for business users. Extremely easy to use. Not copy protected.

CIRCLE 696 ON READER SERVICE CARD



PROBLEM: There's just no easy way to move from one software program to another.

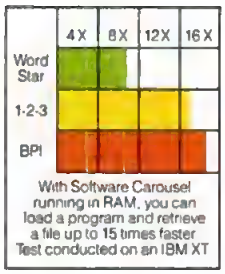
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THE SOFTLOGIC SOLUTION: Software Carousel™

Now you can keep up to 10 programs loaded and ready to run.

Hard to believe, but some people are happy with just one kind of PC software. Well, this is not a product for them.

But if you're someone who depends on many packages, all the time—someone who'd use several programs at once if you could, well now you can. With Software Carousel.



With Software Carousel running in RAM, you can load a program and retrieve a file up to 15 times faster. Test conducted on an IBM XT

Why call it "Software Carousel"?

In some ways, Software Carousel works like the slide projector you're used to. You load a handful of pictures, view one at a time, then quickly switch to another. A simple idea, with powerful possibilities for computing.

Here's how it works. When you start Software Carousel, just tell it how much memory you have, load your software and go to work.

Need to crunch numbers? Switch to your spreadsheet. Need your word processor? Don't bother saving your spreadsheet file. Just whip over to your document and do your work. Snap back to your spreadsheet, and it's just like you left it.

With up to ten different programs at your fingertips, you'll have instant access to your database, communications, spelling checker, spreadsheet, word processor, RAM resident utilities, languages, anything you like.

Reach deep into expanded memory.

This could be the best reason ever for owning an expanded memory card, like the Intel Above Board, AST RAMpage, or any card compatible with the L/I/M Extended Memory Standard.

Software Carousel puts programs into this "high-end" memory for temporary storage when they're not in use. And switches them back out when you want them. It's fast, efficient, and easy.

If you want, Software Carousel will even use your hard drive for swapping. Just allocate a portion for storage, and go to work.

Sidekick, Superkey and Ready. All at the same time.

You know what happens if you try loading two or more RAM resident utilities at once. You get crashed keyboards, frozen screens, all kinds of interference between programs fighting for control.

With Software Carousel, you can have as many accessories and utilities on-tap as you want. Just load different ones in different Carousel partitions. Since they can't see each other, they can't fight.

The easy way to maximize PC power.

With all this power, you might think Software Carousel is complicated and difficult to use. Not so. Particularly when you compare it to other programs like Windows and TopView.

Set it up once and Software Carousel remembers forever. Better still, Carousel will look for the programs you use most often and optimize them for quickest access.

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CIRCLE 336 ON READER SERVICE CARD

NOW YOU SEE 'EM, NOW YOU DON'T

Pull-down menus are seductive, inviting, and plain old fun to use. But do they leave power users hungry for more than only baby-sized bites?

Simon and Shuster's *Webster's New World Writer* and *PFS:Professional Write* are both brand-new, easy to use, beautiful to look at, and have a single command line with pull-down menus at their core. Do these programs prefigure the shape of things to come, or are pull-down menus a flashy trend ratified by a PC public that covets the most seductive aspect of the Macintosh?

PULL-DOWN YEAS As a program becomes more functional, it gets harder to create the proper user interface. Software Publishing Corp. used function key commands for *PFS:Write*, but the increased functionality of the *Professional* series forced a different tack. "We could add Shift-Function and Alt-Function keys and confuse the user, or migrate to a menu bar with pull-down menus," comments Sam Edwards of Software Publishing Corp.

There are obvious advantages to a pull-down menu structure. Pull-down menus offer controlled exploration of a software program—the least circuitous route for a new user. Menus guide you through command options when you need them, but stay conveniently tucked out of sight when you don't. Because the functions are grouped beneath a heading on the menu bar, there's a stringent command hierarchy that you can't get lost in.

Pull-down menus provide a seamless transition from the writing process to the command process. You always interact with the commands while your document remains on-screen. There is no need to traipse to the print format or file-saving option screens. There's no need to flit between text mode and command mode.

On-screen help and the command structure for pull-down menus are interwoven. You can get help right on the screen for a specific function in a category. Older user interfaces that depend on human memory instead of pull-down reminders are a turnoff for many novice users. If you haven't memorized the commands, your options are unpleasant. *WordStar*'s half-a-screenful of command prompts hogs up writing space. *Volkswriter Deluxe Plus*'s command help exits text mode and draws a function key template. *PC-Write*'s overwhelmingly full command menu summary screen is shockingly cluttered.

A veritable user-controlled command-in-the-box, pull-down menus are seductive, inviting, and plain old fun to use. You're spared from leaving your document, often spared the agony of reaching for a program manual, and spared from living with some cockamamy plastic template on your keyboard. While these other alternatives make you want to turn in a plain vanilla document, pull-downs inspire the use of word processing tools. When changing a type style is as easy as pulling down a menu and pressing "B" for Bold, you're more apt to try bold in your document.

Best of all, the pull-down menus are a user interface that works well across all applications. Macro categories such as Print, Format, and Search are topics shared by database, spreadsheet, and word processing applications. The command structure is portable and its parsimony translates into ease of use between different programs as well as within a single program.

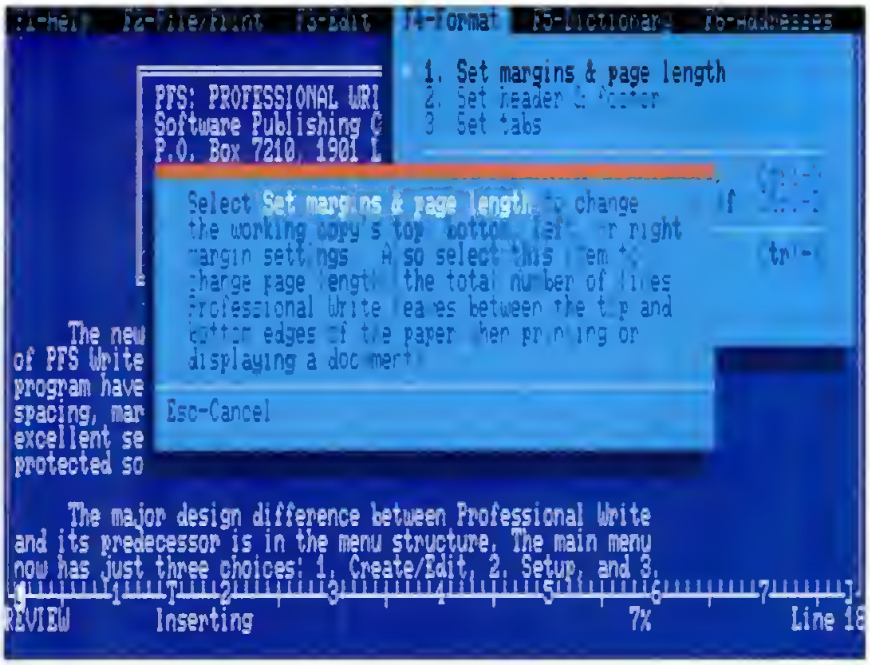
PULL-DOWN NAYS Does this mean that pull-downs will become the blue jeans of software—a standard uniform? I doubt it. Many users and software designers find hierarchal pull-down constricting. "It's not a design issue I consider important," said Scott Anderson of Ann Arbor Software, creators of *Textra*. "I like the look of pull-down menus, but they force a structure on things."

Pull-downs must cram a great deal of information into a narrow pull-down on-screen box. While this keeps things simple, it also keeps them rigid and occasionally ambiguous. Some commands that defy easy categorization wind up miscategorized or in an eclectic dumping ground labeled "other." Programs like *Textra* can make use of a full 80-column screen to offer command help or selections when necessary. Pull-downs must offer the options tersely inside a box.

Power users scoff at the baby-sized bites pull-down menus require. In general, pull-downs require more keystrokes than other user interfaces. A frequent user of a program can type a string of commands much faster than open and select choices from pull-downs. The best pull-down menu programs (*Webster's* and *PFS:Professional*) have commands that bypass the tedious process.

According to Claudia Kohler, Lifetree spokesperson, *Volkswriter Deluxe Plus* would rather trust its "tried-and-true help key and function key command structure" than jump on the pull-down bandwagon. *Volkswriter* is fast, nearly as easy, and probably more flexible. Lifetree has enhanced the program on numerous occasions, possibly with more ease than it could have if the program used a pull-down interface.

The Macintosh culture was forced into a single-user interface. Here at the PC prompt command, our fate is still undecided. The contenders: slash keys à la Lotus, control keys à la *WordStar*, pull-down menus, flat menus, mice, Alt-key commands, and various combinations of these vie for our affections. In the meantime, who knows, but one manufacturer of accounting software, Q.W. Page Associates in Toronto, Canada, has developed a program called *NewViews* that's available in a choice of five different user interface flavors.—**Robin Raskin**



One of the major improvements in PFS:Professional Write, *making it an Editor's Choice, is the new system of pop-up menus that allows formatting changes without exiting the document. Context-sensitive help screens are another winning attribute.*

and printing. An excellent setup program makes installing the non-copy-protected software for various hardware a simple matter.

The major design difference between *Professional Write* and its predecessor is in the menu structure. The main menu now has just three choices:

1. Create/Edit
2. Setup
3. Exit

All page formatting, file saving, and printing is done with the document on the screen rather than by exiting to a separate menu. The keys F1 through F6 are listed at the top of the screen next to the names of their functions: Help, File/Print, Edit, Format, Dictionary, and Addresses.

Pressing F2 through F6 causes a pull-down menu of options to open in a window directly beneath your choice, with the cursor and Enter keys controlling selections. If you open one of these windows but it does not contain the option you were looking for, the left and right cursor keys will let you open all the menu windows one by one. The pull-down menus also list the Ctrl-key combinations that drive the features directly, so you learn the faster ways of doing things as you use the menus. All this adds up to a terrific user interface. *Professional Write* is so easy to use that had I not been reviewing the program for this publication, I never would have opened the documentation.

CONTEXT-SENSITIVE HELP The F1 key brings up, as always, the Help file window over your document, and the help has improved dramatically since *PFS: Write*. The available help is now complete and context sensitive so that the program can give advice no matter what function you are trying to perform with the program. The File/Print menu (F2) lists the expected choices for saving (PFS, ASCII, DCA, or Encrypt formats), retrieving, inserting, printing, and deleting files, along with an unexpected macro feature that allows you to set 35 Alt-key combinations. Macros may be recorded "on the fly" as you work, and there is nothing you can do from the keyboard that can't be done with a macro. You may type text, move the cursor, use function keys, toggle CapsLock or Insert, and so forth.

The Edit and Format pull-down menus (F3 and F4) list the commands for manipulating text, setting margins, justifying lines, search and replace, and even line drawing using one of three line widths, so you can draw boxes and crude graphs as you process your text. Block operations have been expanded to include cut, copy, move, save, print, indent, single or double space, and type style. The Dictionary options (F5) check the spelling of a word or the entire document, and suggest synonyms from the 77,000-word dictionary. You may create a personal dictionary of 5,000 words.

The inclusion of F6, the Addresses menu, makes this program much more than a word processor and is one of those rare minor features that really does enhance the role of the software. An address book can hold records for 256 people or companies, but you may create as many different address books as you like. Each record contains fields for title, first and last names, position, company name, two address lines, city, state, and zip code, work and home phones, and two comment lines. You can search for an address by filling in the information you want in any field, and *Professional Write* can locate records given multiple search criteria, too. Wildcards are allowed.

You can use this address book function to check information, cut and paste an address into your working copy, or merge data from an address book into a mailing using a powerful and simple-to-use record-sorting procedure. This is a fantastic feature.

Documentation for *Professional Write* is excellent, though much of it may be superfluous given the context-sensitive nature of the help that is available throughout the program. The concise manual is very well organized and clearly written, making this package extremely attractive to the business user who hasn't got much time for homework.

PFS:Professional Write is a well-planned evolution of the original *PFS:Write* product that retains all of the simplicity for which it has always been known and loved while boosting the power features that business users demand. I'm sure that I will be recommending it to clients for years to come.—**Phil Wiswell**

Quite incredible.

The IBM Proprinter XL. Under $800.



For under $800, the Proprinter XL packs an incredible number of features into a single machine.

It's the wide carriage model of the Proprinter and it attaches to most personal computers.

The Proprinter XL lets you print spreadsheets (see below) on paper up to 16½ inches wide. It lets you print on standard computer paper, too. And, without removing the computer paper, you can easily feed envelopes or single sheets through a separate slot in the front. You can also switch between fast-draft and near-letter-quality print modes with the touch of a button (what you're reading now was printed on a Proprinter XL). You can even do graphics. But the best thing is, you can do all this--and more--for less than $800.

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Region 3	223.32	234.56	254.12	255.11	267.23	270.23	274.32	276.75	279.65	282.12	284.
Region 4	12.34	21.43	23.45	24.98	25.32	30.98	145.98	156.90	178.89	210.21	213.
Region 5	332.12	343.56	345.76	347.87	349.65	354.33	355.23	357.89	361.12	332.12	311.
Region 6	89.34	91.23	93.46	94.56	95.45	96.67	97.59	98.31	99.89	101.45	101.
Region 7	99.36	100.54	101.45	101.90	102.23	102.09	102.89	103.23	104.21	104.33	104.
Region 8	65.34	66.37	66.98	67.12	67.36	68.23	69.41	70.12	70.78	72.65	73.
Region 9	13.43	15.36	14.98	16.11	16.78	17.32	18.32	18.54	18.99	19.45	20.
Region 10	96.45	97.32	98.49	99.31	100.11	101.23	101.98	102.32	102.87	103.21	104.
Region 11	143.67	144.32	146.47	148.73	149.34	151.23	152.53	153.22	155.78	159.65	162.
Region 12	325.43	326.46	326.98	354.32	312.29	315.46	320.21	332.87	332.91	335.12	334
Region 13	243.78	245.11	211.36	201.98	213.48	224.31	223.47	229.31	231.35	239.43	241
Region 14	540.11	540.78	541.43	543.95	544.21	544.99	545.37	543.79	548.73	549.39	550
Region 15	436.49	433.82	435.99	448.93	451.78	452.23	453.78	455.39	456.31	462.45	463
Region 16	357.36	352.57	353.11	353.98	354.32	355.52	356.26	357.41	358.32	359.29	362
Region 17	392.43	393.41	311.84	316.93	325.38	332.34	334.29	335.28	335.99	338.72	342
Region 18	431.21	433.93	434.25	435.26	435.87	436.31	436.25	437.42	437.97	438.32	439
Region 19	35.86	35.21	35.98	36.31	36.11	36.84	35.98	36.73	36.82	36.89	37.
Region 20	146.73	146.99	147.36	147.93	148.91	149.32	152.52	153.19	154.21	154.79	154.
	4360.44	4411.52	4336.36	4397.05	4410.71	4466.53	4601.06	4649.98	4705.24	4744.57	4767

Incredibly quiet.

The IBM Quietwriter® Printer Model 2.

DEC	TOTAL
3.09	3261.51
2.98	1700.45
92.12	3193.98
80.12	1274.36
10.43	4101.29
03.12	1163.06
74.23	1201.45
15.49	773.83
04.55	294.17
64.37	1272.07
86.31	2003.84
60.99	3858.02
62.48	3047.08
64.39	6457.56
63.97	5314.28
14.28	4264.87
11.01	4200.26
97.88	4834.19
15.35	555.29
92.88	1739.82
60.04	54511.38



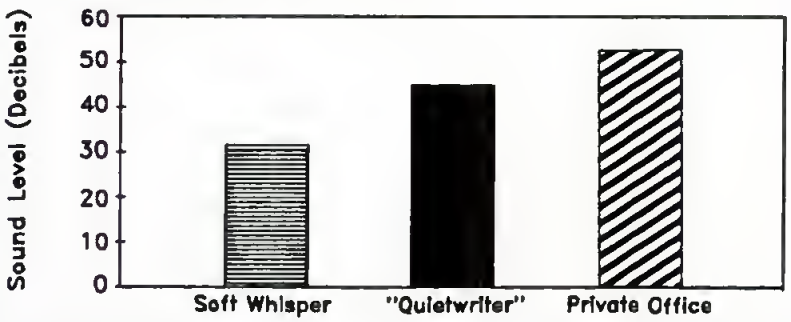
The "Quietwriter" Printer Model 2 prints as crisply as a top-of-the-line IBM typewriter (what you're reading now was done by a Model 2).

Even so, it prints so quietly you may have to remind yourself it's on.

The Model 2, which attaches to most personal computers, is terrific for creating first-rate presentations and reports.

With the right software, it lets you merge text and graphics. It lets you print on single sheets, company letterhead, or even on transparencies to use on overhead projectors. And there's an optional paper feeder to help you print multi-page reports with ease.

But the best thing is, you can do all this--and more--at just above a whisper.



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CIRCLE 162 ON READER SERVICE CARD



PractiCorp International's PractiWord, *a* WordStar*-style package, presents WYSIWYG text on-screen and includes page break indicators as well. On this screen, the Save and Block menus have been called up. The status line reports page, line, and column numbers.*

PractiWord

The recent trend in low-cost word processors couples power with ease of use. *PractiWord* strives toward this goal, but even with all of its wonderful features, it has some glaring shortcomings.

PractiWord is made by PractiCorp International, which also makes *PractiBase* and *PractiCalc III*. Originally written for the IBM PC*jr*, *PractiWord* has been expanded to include some impressive features such as automatic table of contents generation, indexing, the ability to use abbreviations, and boilerplate files. The most obvious deficiency becomes evident when you decide to print a document: in order to print, you must leave the current document and call up a separate print menu.

PractiWord is slow, too. This is most apparent while scrolling through a document. Other than these problems, both of which will be corrected with the next version, *PractiWord* is easy to use and has an abundance of features.

The initial setup of the program is simple. An option screen lists the changeable formats, which include margins, the display of page breaks, full text justification, word wrap, and tab settings. Also available is an automatic save setting, which can be changed to a reminder to save your work. Printer selection is possible through a submenu, as is color customization.

Creating and editing a document with *PractiWord* is a pleasure. The status line at the bottom of the page contains the current default settings plus the filename and page, line, and column numbers. Editing commands are issued with either *WordStar*-style Ctrl-key combinations or function key commands. *PractiWord* can read *WordStar* files directly. You can use direct commands to delete a character, word, line, or from the cursor to the end of the word. You accomplish all other deletions by marking the text first and then executing the delete. You can quickly copy blocked text to another file or merge it from a separate file.

Once you finally get over to the print menu (after saving and exiting the document), printing becomes simple enough. Before you actually print, though, you must recall the document, specify the number of copies, verify starting and ending page, and, finally, choose Begin Printing. The advantages to this procedure are the ability to change the number of copies printed and the possibility of printing only selected pages from within a document. The clear disadvantage is the amount of time it takes to go from on-screen text to a hard copy. For printing, your text can be formatted with boldface, double strike, underline, superscript, or any two in combination. A comment mode is also possible, which allows you to show text on-screen and not have it print. Page formats are controlled from the two options screens and dot commands (control codes placed within the document).

PractiWord offers a number of advanced features, too. "Boilerplates," or often-used text, can be stored in a separate menu and accessed during editing or printing; data files can be merged printed. Abbreviations can be written and stored to make editing faster. The abbreviations capability can be used to write macros. All told, *PractiWord* is an above-average word processor. When PractiCorp fixes the printing shortcomings and adds a spelling checker, *PractiWord* will be practically perfect.—**Christopher Barr**

PC MAGAZINE

FACT FILE



PractiWord
PractiCorp International Inc.
The Silk Mill
44 Oak St.
Newton Upper Falls, MA 02164
(617) 965-9870

List Price: $99.95
Requires: 128K RAM, one disk drive, DOS 2.0 or later.
In Short: An easy-to-use, full-featured (but no spelling checker) word processor with a tedious print-formatting procedure. Not copy protected.

CIRCLE 688 ON READER SERVICE CARD

Textra

At only $19.95 postpaid, *Textra* is probably today's best buy in commercial software. Don't expect all the sophisticated extras of *WordPerfect* or *Microsoft Word*, but you'll be astonished at how many features Ann Arbor Software has shoehorned

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You won't find a higher EGA resolution.

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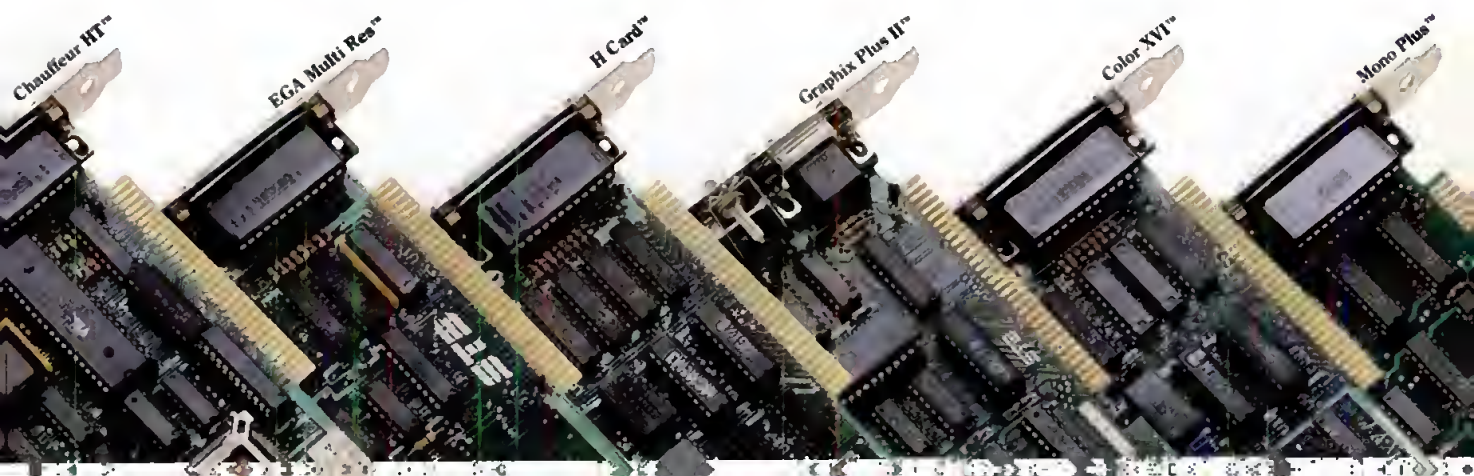
STB Systems, Inc.

1651 N. Glenville, Suite 210, Richardson, Texas 75081

CIRCLE 517 ON READER SERVICE CARD

*STB includes drivers for Microsoft Windows with the resolutions of 640 x 480, 752 x 410 and 832 x 350.
*CGA software that is compatible with the IBM Enhanced Graphics Adapter.

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Textra, *which gets the nod as a super-low-cost Editor's Choice, has many features that make it feel like a much more expensive program. Pop-up menus, such as this highlight menu, are a good example.*

into an amazingly affordable one-disk package.

Textra is an ideal starter program for someone just learning about computers or word processing. It offers thorough context-sensitive help, and to supplement its built-in help pages, it allows you to create custom help screens. The Alt-U "hot key" combination brings up a full-screen main menu, which leads, through up to 27 possible user-defined help links, to multiple layers of pages of text that you create. Use the custom system to write short reminders of frequent procedures or as a mini reference guide with information about your area of interest.

In addition to customizable help, *Textra* includes a slick and informative series of demonstrations called "film-on-disk tutorials." Once you start these short presentations you can pause, rewind, or even fast forward through each of the on-screen lessons.

Textra's thoughtful design is apparent from the moment it loads. The opening screen presents a numbered list of files, and if you can't remember your file's name, take a quick peek at the first page of any file in the directory. To make identification easier, *Textra* highlights files with certain extensions (.DOC or .LET files, for example).

You'll first notice *Textra*'s speed when you load a file. Shorter files seem to pop onto the screen almost instantly. Cursor movement is just as fast. With one of *Textra*'s shortcuts, I jumped from the top of a 50K-byte file to the bottom in a flash.

Textra even includes nine bookmarks you can use to return quickly to specific points in a file.

While you edit, the F1 key cycles three simple horizontal-bar function key menus. For faster access, Ctrl or Shift keys combined with function keys directly execute secondary commands. Often, after you've chosen a command, you'll be clearly prompted to toggle suboptions on or off. After you select Replace (Shift-F4), for example, you'll find Global replace or Query replace and Forward and Backward search options. You use function keys to highlight the combination you want when the command executes.

TRICKY FORMATTING If *Textra* falters in any area, it's in formatting text. But even here, its drawbacks are minor. Instead of true WYSIWYG, *Textra* uses highlighting to specify and display text enhancements. For example, on a color monitor, green text is underlined and yellow text is boldfaced. *Textra*, Version 3.1, had only two possible text enhancements. Version 4.0 has seven possible text enhancements, all of which can be customized. But getting the most out of your printer requires some understanding of the control codes it needs. Professional word processing packages come with drivers that translate their formatting instructions to printer-specific codes. *Textra* does require some do-it-yourself configuring, but if you know your printer's codes, you should be able to customize and control its built-in typefaces easily. If you need more than seven types of text enhancements, *Textra* provides commands to embed control codes within a document.

To specify page layout, *Textra*'s latest release lets you call up a clever miniature representation of a typical page. Immediately, you see how changes in margin and paragraph-indent settings affect the appearance of your printed page.

Using several margin settings on a page for more-complicated documents can be difficult with *Textra*. Many programs allow you to control such formatting with embedded ruler lines. *Textra*'s solution is to provide a set of secondary margins. Alt-M quickly switches from main margins to the secondary set. But while secondary margins would be a fine addition to em-

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Textra
Ann Arbor Software
345 S. Division
Ann Arbor, MI 48104
(313) 769-9088
List Price: $19.95 without phone support, $39.95 with phone support.
Requires: 200K RAM, one disk drive, DOS 2.0 or later.
In Shrot: *Textra* offers a great deal of power for the price. It's well designed, easy to use, and fast. Not copy protected.

CIRCLE 687 ON READER SERVICE CARD

bedded rulers, they are simply not an adequate replacement.

Textra's $19.95 price includes one disk and a manual. A $39.95 version includes new, unlimited 800-number phone support. Ann Arbor Software is inaugurating a subscription service that will provide 1 year of upgrades for $49.95 or $79.95 (without or with phone support, respectively).

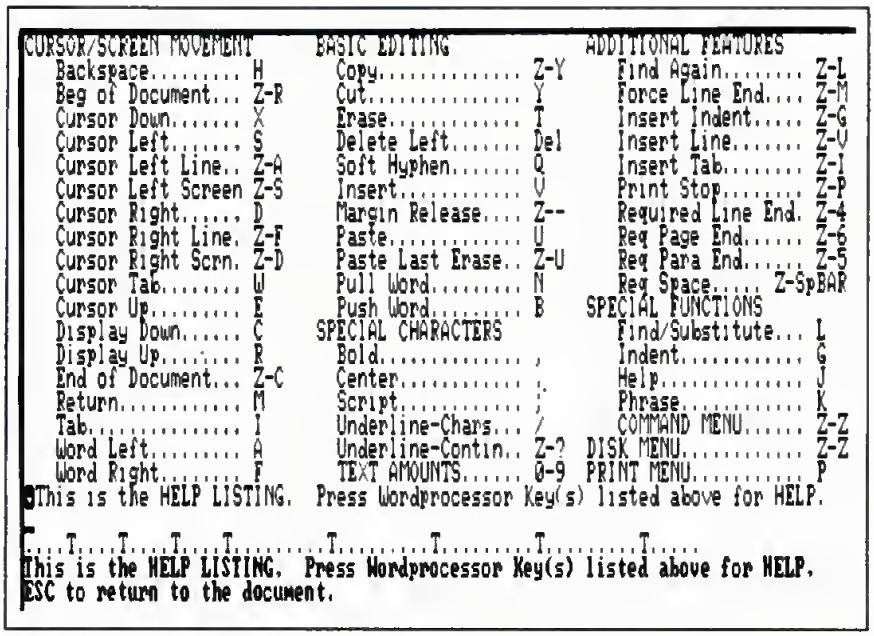
For uncomplicated jobs, you'll find a lot to like about *Textra*, and at $19.95 you can easily afford to risk a try.

—Stephen Sagman

THE Wordprocessor

THE Wordprocessor from Indian Ridge Enterprises is a low-cost word processor that is loosely modeled on a *WordStar*-like command format. Although the product has a few interesting features, it lacks true power and flexibility, which reduces its overall utility. Even at the modest cost of $49.95, *THE Wordprocessor* is not a real bargain.

With a low-priced product, one tends to expect ease of installation, ease of use, and ease of learning. *THE Wordprocessor* is at least easy to install. The product comes on a single disk and can run on a minimal system; only 128K bytes of RAM and a single disk drive is required to run the product. After copying the files, an installation program must be run that initializes *THE Wordprocessor* for your system. Typing TWP will then boot the program.



THE Wordprocessor's *main help screen invites you to select a specific kind of help by means of a single keystroke. Other unusual features include a memory or disk phrase library and seven levels of superscripts and subscripts.*

For $49.95, you don't expect fancy colors and graphics, and with *THE Wordprocessor* you don't get them. The starting menu is a sparse affair listing seven choices: create a new document, edit an old one, print a document, display the directory, access help, access ASCII options, and exit. The reason that the ASCII menu is necessary is that *THE Wordprocessor*, like *WordStar* and *My Word!*, uses a proprietary format to store files. However, the product will read and write ASCII files for convenience.

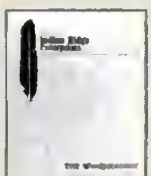
Choosing the create-a-new-document option presents you with a clean-looking, uncrowded screen. The top has a single ruler line, and the bottom of the screen shows a status line. Otherwise, there is only blank screen, which fans of the "blank paper" look will appreciate.

The real problem with *THE Wordprocessor* is its unwieldly command structure. In order to accomplish almost anything, you need to tell the word processor that you are ready to give a command, which you do by typing Ctrl-Z. Only then will the product accept commands, meaning that sequences of four or more keystrokes are necessary in order to perform the most basic actions. Worse yet is the fact that there is no logical assigning of secondary commands (after issuing the Ctrl-Z code). For example, the T key stands for erase, H is for backspace, the comma is for boldface, and the slash key is for underline. Are you confused yet? *THE Wordprocessor* does come with a set of stick-on labels that will cover a good part of your keyboard, but it doesn't really make the command structure any less cumbersome. And even though help is available on-line, it didn't seem to make the product any easier to use.

To be sure, the product does have a few nice touches. There are seven levels of superscript or subscript available, which move incrementally at ½ line per level. And the product has a nice phrase library, with both temporary (in memory) and permanent (disk-based) phrases of up to 20 lines each available. There is also a multiple-copy feature for block moves.

However, *THE Wordprocessor* is not WYSIWYG, the manual is confusing and not indexed, and the company charges for support. All in all, *THE Wordprocessor* is hardly a deal. In the same price range, *My Word!* has more features (including a spelling checker) and is better supported

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THE Wordprocessor
Indian Ridge Enterprises Inc.
508 2nd St.
Jack London Sq.
Oakland, CA 94607
(800) 992-9255
(800) 992-9245 (in Calif.)

List Price: $49.95

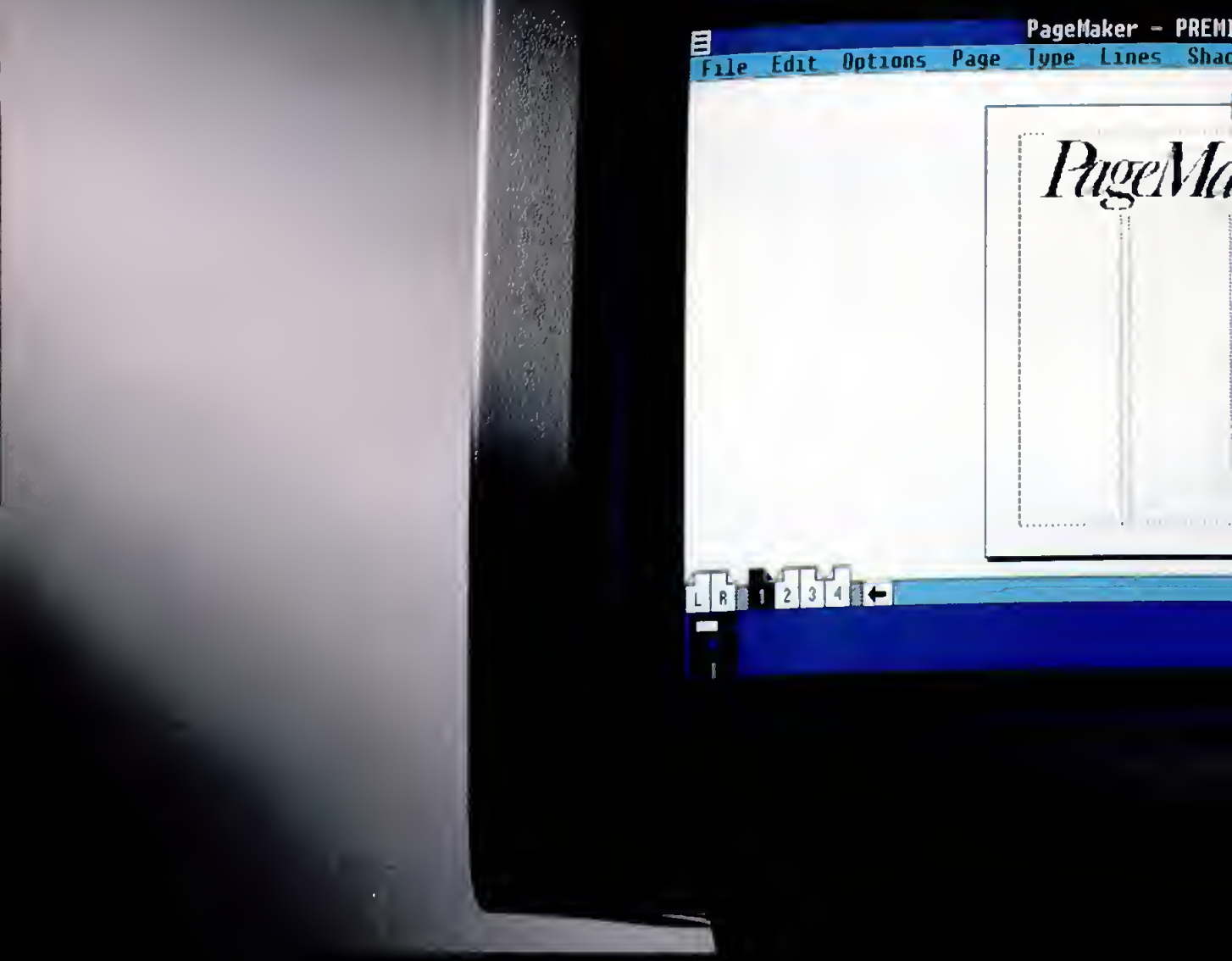
Requires: 128K RAM, one disk drive, DOS 2.0 or later.

In Short: A *WordStar*-like word processor that lacks true flexibility and power. Not copy protected.

CIRCLE 695 ON READER SERVICE CARD

WORLD P

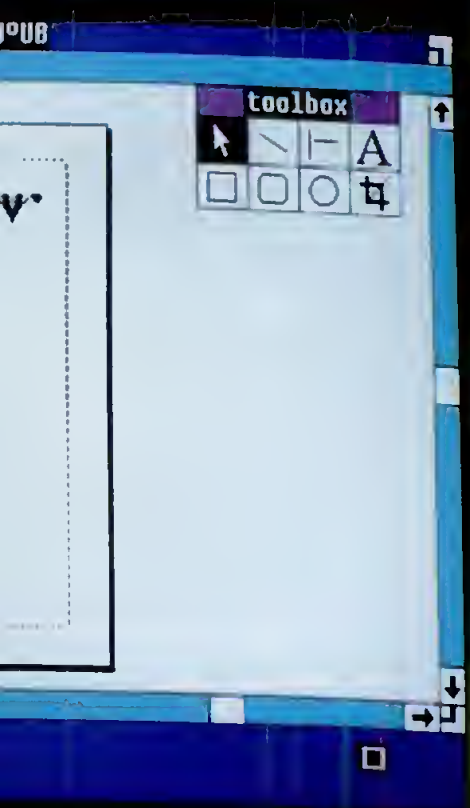
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and easier to use. After using *THE Wordprocessor* for a while, I was more relieved than ever to get back to my trusted copy of *Word Perfect*. This is not a word processor to recommend to your friends.
—Jon Pepper

Volkswriter Deluxe Plus

It would be a great injustice to call *Volkswriter Deluxe Plus* a low-cost software product since that often conjures up an image of an ineffectual, limited product. Rather, *Volkswriter Deluxe Plus* is one of the best word processors available at any price, which in this case is a paltry $99.

Actually, *Volkswriter Deluxe Plus* was once Lifetree Software's top-of-the-line product, with a price tag of $295. But when the company introduced *Volkswriter 3 Deluxe*, Version 2.2, (as the product was known then) got lost in the shuffle. However, popular demand for Version 2.2 was so great that Lifetree added a 100,000-word spelling checker, automatic paragraph reformatting, and a few other goodies and reintroduced the product in its current incarnation as *Volkswriter Deluxe Plus*. While some products may be easier to learn and some may be more powerful, there are arguably none that do a better job at combining the two.

FEATURE LADEN *Volkswriter Deluxe Plus* comes on two disks, with a well-written, indexed manual and a quick-reference card. The program is quite easy to install,



Scroll-right capabilities allow the text in this Volkswriter Deluxe Plus *file to run off the screen at the right. A summary of function key help is also displayed on-screen.*

with a batch program that will lead you through the hard disk installation procedure. The first time you run the program, a configuration utility will run that sets certain defaults—monitor type, whether you want a beep on error, printer type, and so on. You can easily modify these defaults later on.

Of particular note when installing *Volkswriter Deluxe Plus* is the range of support features offered for varying system configurations. Not only does it support more than 200 printers, but it includes utilities to support 43-line displays (with an EGA card), high-speed keyboard repeat on the AT, and the PC Network protocol. I found that the utility commands for the 43-line mode and high-speed keyboard repeat also worked with other programs, which is an added bonus.

When you're ready to go, typing VW brings up the opening menu, which occupies the top several lines of the screen. From this menu you can issue single-letter commands to edit a file, retrieve a file, print, access help, and numerous other tasks, including displaying the directory of any disk or subdirectory that is on-line.

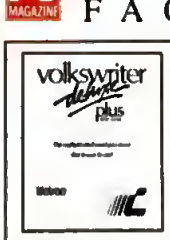
Once you are creating or editing a document, the menu disappears, leaving you with a blank screen for a work area, except for an informative status line at the bottom of the screen.

Volkswriter's rich set of features is driven by the ten function keys, either alone or in combination with the Alt, Shift, and Ctrl keys. If you forget a command, F1 will pop a menu up showing every function-key combination as a quick reminder. Although the program doesn't have context-sensitive help, the odds are you won't need it. The on-line tutorial is excellent, and the manual is very well done. Also, there aren't so many commands that you will feel lost in a sea of keystroke combinations.

In addition to the function-key commands, *Volkswriter Deluxe Plus* uses a set of embedded dot commands for 12 functions, including the creation of headers and footers, forced page breaks, and sending control sequences to the printer. Otherwise, the function-key assignments control all of the program aspects.

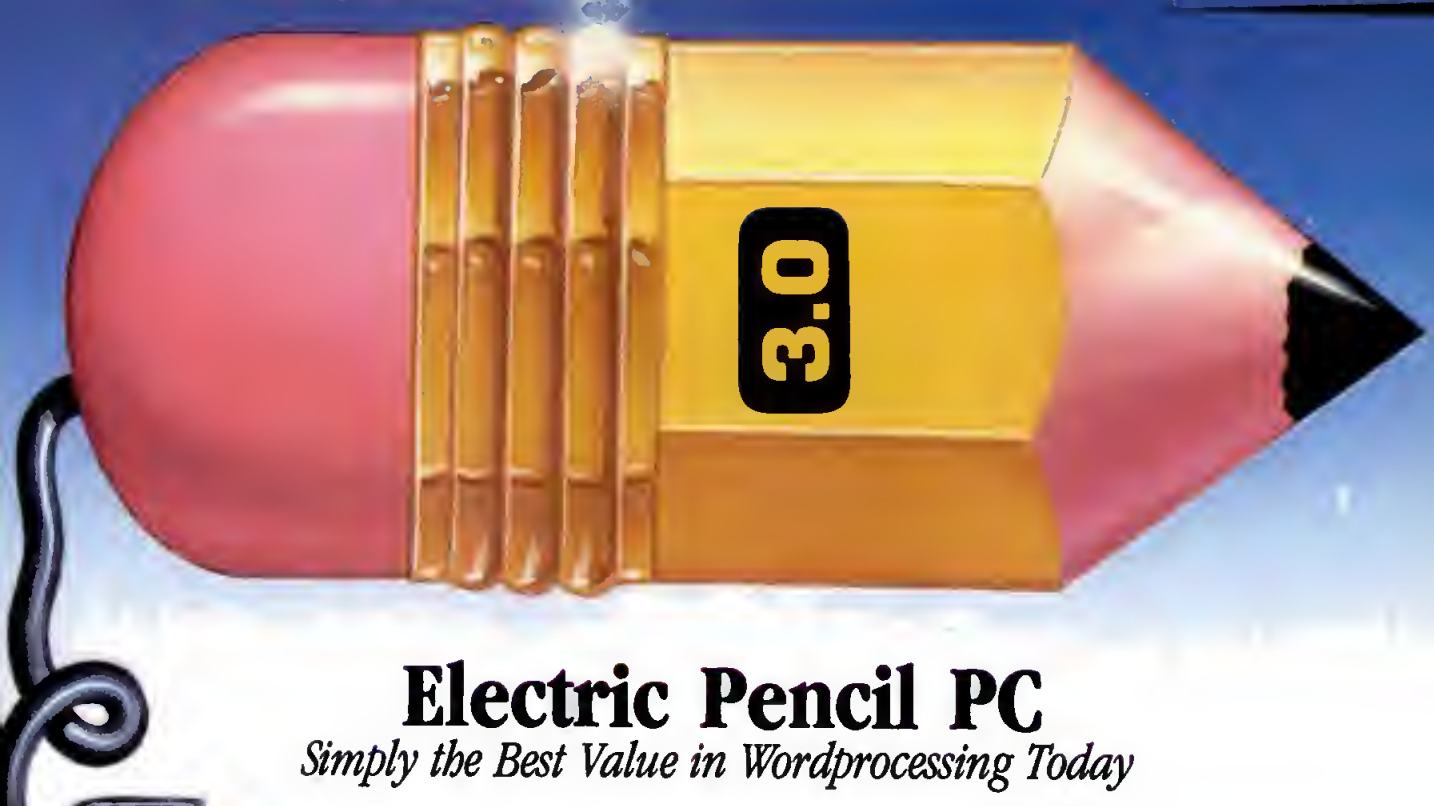
PERFORMANCE PLUS *Volkswriter Deluxe Plus* features a swift text editor that outperforms a lot of products and enough

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Volkswriter Deluxe Plus
Lifetree Software Inc.
411 Pacific St.
Monterey, CA 93940
(408) 373-4718
List Price: $99
Requires: 256K RAM, two disk drives, DOS 2.0 or later.
In Short: ***Volkswriter Deluxe Plus*** **is a high-quality, feature-laden, powerful word processor. Not copy protected.**

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With as many features as wordprocessors selling for 10 times the price, Electric Pencil PC was designed to be sophisticated enough for the professional user yet simple enough for the beginner. Our "Quick Start Guide" will have you writing, editing, and printing in less than 20 minutes. Once you have the basics, any of 500 functions are available with a simple key-stroke. The on-screen help and extensive tutorial windows are like having a manual on disk.

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ELECTRIC SOFTWARE CORPORATION

9230 MARKVILLE DR. DALLAS, TEXAS 75243

MINIMUM HARDWARE REQUIREMENTS.
IBM-PC/XT/AT or compatibles and Tandy 1000 128K memory, one disk drive, PC-DOS, MS-DOS 2.0 or higher. Color or monochrome monitor.

MS-DOS is a trademark of MicroSoft Corp IBM and PC-DOS 2.0 are registered trdemarks of International Business Machine Corp Tandy is a registered trademark of The Tandy Corp Electric Pencil PC, PC Proofreader and Pencil Tutor are registered trademarks of Electric Software Corporation.

features to keep most users quite content. It has everything you would expect—excellent search and replace, block moves, and good cursor control—and several things that you wouldn't expect. These include automatic horizontal scrolling, a notepad that allows you to jot down ideas without leaving your document, a filter that strips control codes for communications, and a mail-merge feature for form letters.

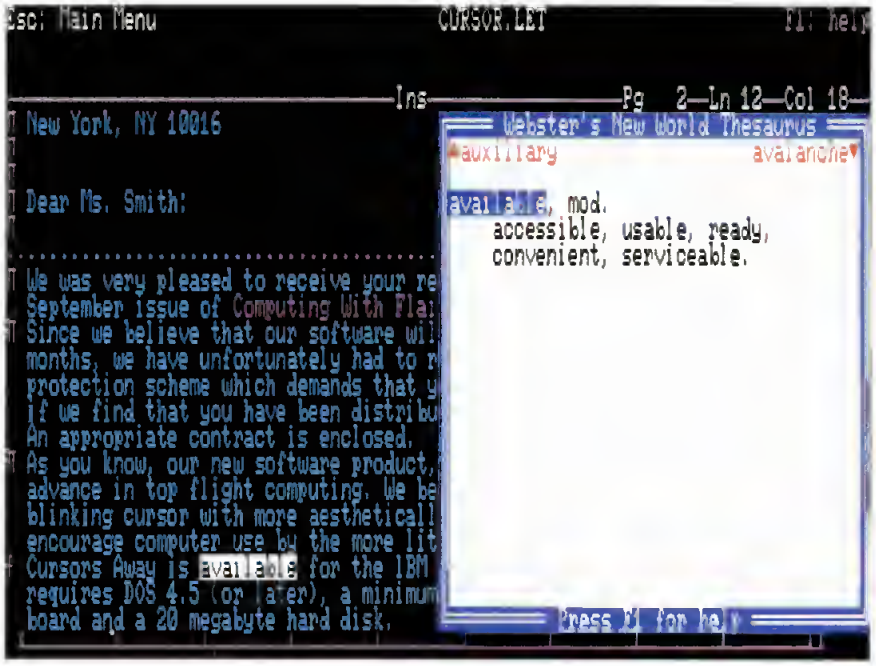
When it comes to WYSIWYG, *Volkswriter* does an excellent job, and printing the screen image is also swift, easy, and well implemented. Although it doesn't support true style sheets, *Deluxe Plus* does have formats that can be assigned (and easily changed) for a document. With this method, you can create a specified format for your weekly production reports, such as assigning a format extension like .RPT. Although it isn't difficult to create formats with *Volkswriter*, the ability to save a predefined format is a timesaver.

Volkswriter Deluxe Plus shares a basic look and command set with its big brother *Volkswriter 3*. For $295, *Volkswriter 3* adds an extra 70,000 words in the dictionary, automatic hyphenation, expanded column manipulation, true style sheets, math, decimal tab, and sorting. Since the basic commands and performance are essentially the same, the upgrade is quite smooth for those who need the extra features.

To compare *Volkswriter Deluxe Plus* against most other low-cost programs is really unfair since you would have to spend considerably more money to find a word processor that's better. A short review like this doesn't allow enough space to mention all the good things about *Volkswriter Deluxe Plus*. Perhaps it's enough to know that at $99 *Volkswriter* is much more than an excellent product—it is an excellent bargain as well.—**Jon Pepper**

Webster's New World Writer

Webster's New World Writer seems to have paid close attention to "old-world" word processors and perfected the art of creating an attractive, yet powerful, user interface. Bundled with the proven *Webster's New World Spelling Checker* and *Webster's New World On-Line Thesaurus*, the program should delight users looking for a full-featured writing tool.



Included with the Webster's New World Writer *is the popular on-line thesaurus, a handy pop-up facility that allows unlimited browsing from reference to reference.*

Webster's has extensive command-driven menus, yet because of their hierarchical pop-up nature, they don't get in your way. A single command line invoked by pressing Esc brings up a seven-item main menu covering the program's major operations. Select a menu item, either by specifying the first letter of the command or by using the arrow keys, and the submenus appear. You are never inundated by more than a single line of commands.

While you're learning *Webster's* ropes, the extensive on-line help can be configured to appear automatically after each menu selection. Automatic help can be disabled and then invoked only when you need it. Ultimately, a series of Alt-key commands bypasses and speeds up the manual menu selection process.

Webster's on-screen formatting capabilities are extensive as well as impressive. Format commands are easy to use, but the program accommodates multiple formats within a document, and they are all completely WYSIWYG. Each time you define a format, *Webster's* displays a format fence. The fence contains settings for spacing, margins, justification, and tabs. These formats can be user defined, stored, recalled, and removed from a document. The result is a rich-looking document that isn't painful to produce. *Webster's* has no facilities for subscript and superscript or italic formatting.

In addition to using intuitively sensible commands for handling search and replace

PC MAGAZINE FACT FILE



Webster's New World Writer
Simon & Schuster
1 Gulf + Western Plaza
New York, NY 10023
(800) 624-0023
(212) 373-8882
List Price: $150

Requires: 256K RAM, two disk drives, DOS 2.0 or later.

In Short: An easy-to-use word processing package with an excellent thesaurus, a spelling checker, and a spiffy user interface. Not copy protected.

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■ WORD PROCESSORS

PC MAGAZINE EDITOR'S CHOICE

***PFS:Professional Write** is at the top echelon of our low-cost price range, but the extra money spent on this program isn't wasted. The five pull-down menus are parsimoniously gorgeous. Writing is a smooth process with all page formatting, file saving, and printing done while the document remains on-screen. Its 77,000-word dictionary offers synonyms, too. An address book with search and mail-merge capabilities makes this a word processor–plus. The documentation looks good, but we didn't need it. Now that's what we call easy.*

*If the address book isn't a high priority, take a look at **Webster's New World Writer**. Intuitively simple, it uses a menu bar with nine pull-down menus that offer excellent writing tools, including a much more lexically intelligent spelling checker and thesaurus.*

*When price is the top priority, take a look at **Textra**. It doesn't have all those pretty pull-down menus, but this program has a full array of word processing features. It combines a thoughtful and well-organized command structure with almost instantaneous response times. Press PgDn and you're there so fast you won't believe your eyes.*

and all block moves, *Webster's* packs the program with features that writers will eppreciate. A Tally command counts the instances of a particular word. A Jump command lets you merk a place in the document and then jump back to that place, and a YoYo command allows you to jump between marks in a document. Even though the program has no windowing features, users will find the document marks can do the trick.

Miscellaneous nifty features include e comment line for including notes that won't be printed in the final copy and a Whoops key to undo accidental deletions.

■ The icing on the *Webster's New World Writer* cake is the inclusion of the top-notch *Spelling Checker* and *Thesaurus* programs.

Webster's can read and export ASCII files. A draw feature lets you create boxes and underlines to enhance your text, a date feature can read the DOS date into your document, and you can drop down to DOS and reenter the program.

The icing on the *Webster's* cake is the inclusion of the top-notch *Spelling Checker* and *Thesaurus* programs. The integration between these programs and the word processor is seamless. Press Esc-T or select the thesaurus while your cursor is positioned on any word, and a synonym list pops up on the screen instantaneously. You can browse through the list, exploring related references, and then automatically substitute your chosen word in the document. The speller is particularly robust, and it flags transpositions of letters, mixed capitalization, and double words, as well as misspelled words. Replacement alternatives are provided.

An invaluable bonus is the Writer's Guide included in the documentation. This jewel includes handy lists of punctuation, misused words, proper prepositions, and other writer's utilities. Notable omissions from the program are facilities for mail-merge, windowing, and keyboard and text macros.

The thesaurus and spelling checker make *Webster's New World Writer* a complete word processing tool. The formatting features are not as extensive as those found in high-priced corporate word processors, but the ease of use more than makes up for the lack of features. Learning to use *New World Writer* was more pleasure than bother, and that's an unusual occurrence.—**Robin Raskin**

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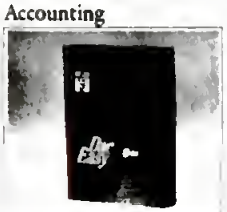
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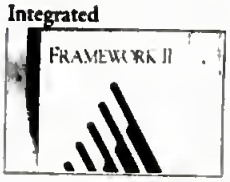
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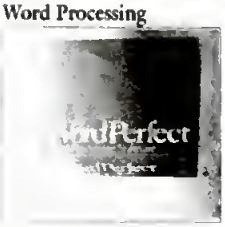
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DOS SHELLS GET SMARTER

Somewhere, someone is trying to copy a 2K-byte file onto a hard disk with 8 megabytes of free space and getting a "disk full" message. Someone else is frantically searching for a document written 3 months ago and misplaced among 1,500 files spread across 30 directories. The first incident is the result of a poorly organized hard disk (the root directory 512-file limit was reached); the second happens every day. In both cases, the users can solve their problems with DOS and a lot of patience.

They could also save a lot of effort and use one of the many utility packages that overcome DOS's shortcomings by extending its capabilities. Each of these programs, called DOS shells, also adds commands and features that should have been an integral part of DOS to begin with: commands such as tag and whereis, and features such as a functional visual tree. Many of them also include utilities, not normally associated with DOS, that encrypt and decrypt files, provide password protection, generate macros and menus, and change a file's date and time stamp.

Since the last article on DOS shells (see "Extending DOS's Utility," *PC Magazine*, Volume 5 Number 9), the products have changed somewhat. For one, they are easier to use. While some vendors have opted for menus, others have gone the route of memory residency. Most of the programs supply an all-encompassing shell from which you can access com-

The best of these DOS-enhancing utility programs make file tracking and manipulation faster, easier, and more flexible.

THE UTILITIES THAT DOS FORGOT

Manufacturers of DOS shell packages often toss in a handful of utilities to smooth out some of the wrinkles in DOS (and you can download lots more from bulletin boards). But one of the best sources of handy programs like these is *PC Magazine*.

The Programming/Utilities column in each issue gives you a powerful little utility that DOS forgot. (This issue's offering is SEARCH.COM, which lets you scan your hard disk to locate files or search for specific text within those files.) Other columns such as PC Lab Notes, PC Tutor, and User-to-User also provide hundreds of relatively tiny, but extremely useful, routines.

We make it easy for you to get your hands on these utilities. Type in and assemble the .ASM source code published with each column, or run the accompanying BASIC programs to create the .COM files directly. Or you can download them from our PC Magazine 1RS (call (212) 696-0360; 300/1200 bits per second, no parity, 8 data bits, 1 stop bit).

We've also taken more than three dozen of the best programs from the past 2 years and put them on one disk: *The PC Magazine Utilities*, Volume 1. (We'll publish additional volumes every year.)





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- BAC.COM, an intelligent backup program.
- DOORS.COM, which lets you switch between two displays in the middle of an applications program.
- DOS-EDIT.COM, which gives you a full-screen DOS command editor.
- FREE.COM and SIZE.COM, which make copying files far easier by telling you exactly how many bytes selected files take up on one disk and how many bytes are free on another.
- KEY-FAKE.COM, which you can use to bypass applications program menus and opening screens.
- NPAD.COM, a pop-up on-screen notepad.
- ONEKEY.COM, a keyboard macro program.
- QUICKEYS.COM, which speeds up any keyboard—dramatically.
- RED.COM, which transfers

mands and features; a few also exit to the DOS prompt for those who wish to avoid the menu maze.

Much in the same spirit, other vendors still prefer to deliver standalone utilities that you enter at the DOS prompt whenever they are needed. Also common are built-in editors (*WordStar*'s command interface is the most common model), screens that display your system's hardware configuration and memory usage, and interfaces that combine a *1-2-3*–like command bar with point-and-shoot menus.

NOT A CRUTCH These utilities are by no means crutches for less-experienced users who can't or don't want to learn DOS. Rather, they help competent PC users work faster, smarter, and better by getting the work done with fewer keystrokes and in less time.

Newer users who want insulation from the harsh realities of DOS may be better served by menuing systems. Among the best: Delta Technology's *direct access*, Aldridge's *PreCursor*, Phoenix Systems'

files from one subdirectory to another without using COPY and ERASE.

- RENDIR.COM, which renames subdirectories instantly.
- SETUP.COM, which pops up a menu in the middle of any application and lets you send control codes to your printer (to change the typeface, spacing, ribbon color, etc.).
- SWEEP.COM, which executes commands across every subdirectory on your hard disk.
- VTREE.COM, which provides a visual representation of the tree-structured subdirectories on your disk.
- WAITASEC.COM, which lets the ScrollLock key halt a fast-scrolling display, then allows you to scroll backward, recalling previous screens.

Volume 1 also contains utilities that prevent applications from resetting your chosen screen colors, that beef up your directory listings, that eradicate sensitive files so they can't be unerased, that check your hard disk or Bernoulli Box for potential problems, that encrypt and decrypt your files, that swap printer ports, that provide quick subdirectory navigation tools—and much more.

We even include a *1-2-3*, Release 1A, driver that displays bar and stacked-bar graphs on monochrome monitors. And we show you how to replace the standard, irritating "Non-system disk or disk error/Replace and strike any key when ready" DOS message with a full screen of friendly, helpful text.

The PC Magazine Utilities, Volume 1, is being offered free with new subscriptions or subscription renewals. If you're interested, call (800) 852-5200 for details.—**Paul Somerson**

Menu Manager, and ModTech's *Hard Desk* (see "Menu Generators: DOS Made Easier," *PC Magazine*, Volume 5 Number 11).

The most essential aspect of a DOS shell is probably an intuitive interface. Ideally, a shell should enable you to get in, perform your task, and get back to the main application with a minimum of fuss, time, and frustration. If it doesn't, it isn't doing its job.

Other features to look for are an easy-to-use move command, the ability to locate files and act on them, and a tag feature that lets you manipulate files within a directory and across directories.

A move command may resemble a combination of a copy plus a delete, but only on the surface. A move is really performing a rename function, as it is simply changing the file's entry in the file allocation table rather than duplicating its contents into a different physical location. Moving the same number of files should take an equal amount of time, regardless of file sizes.

A findfile feature lets you locate any file—hidden or otherwise—with minimum input. You should also be able to specify not only the drive but also the starting directory from which to search. Ideally, once the file or files have been located, the program should have the capability to let you tag, view, or manipulate them in some other manner.

- These utilities help competent PC users work faster, smarter, and better by getting the work done with fewer keystrokes and in less time.

Tags enable you to manipulate unrelated files. While DOS will allow you to operate on more than one file at a time, you are limited to wildcard conventions; that is, DOS does not permit you to copy, for example, three out of ten *.TXT files. You either copy them all at once or one at a time. With a tag feature, on the other hand, you highlight the desired files and then enter the copy command.

Each program implements tags differently. Some require you to pop in the appropriate menu and then highlight the file; others simply have you highlight the file and hit a control sequence. A few of the programs keep the tags active even after you complete the next operation; others remove the tags when you exit the directory.

The 19 DOS-enhancing utilities in this review include new or substantially changed programs since last year, plus last year's Editor's Choices, *X-Tree* and *DOS2ools*. The reviews are arranged in alphabetical order.—**Vincent Puglia**

ALPS Hip-Pocket Helpers

ALPS Hip-Pocket Helpers, from ALPS, is a collection of command-line driven utilities that you can include in batch files or use as standalone programs. The 32 utilities come in all flavors, allowing you to check system configurations, manipulate a file's contents, and reorganize the hard disk. Their strengths are speed and ease of use; their weaknesses are a lack of sufficient documentation and, occasionally, poor error trapping.

ALPS's programs are ideal where disk space is at a premium and work habits are batch-oriented. Most of the utilities take less than 4K bytes and the largest only 8K bytes. Since there is no centralized interface, you execute a utility simply by enter-

PC MAGAZINE FACT FILE



ALPS Hip-Pocket Helpers
ALPS
1502 County Rd. 25
Woodland Park, CO
80863
(303) 687-1442
List Price: $79 (all 32 utilities can also be bought individually).
Requires: 128K RAM, one disk drive, DOS 2.0 or later.
In Short: A collection of 32 standalone utilities covering the gamut from system checking to text manipulation. You may do better by buying the utilities you need separately. Not copy protected.

CIRCLE 674 ON READER SERVICE CARD

DOS Shells: Summary of Features

While most of these programs offer a variety of features, the table displays only those that either are most common or are found to be extremely useful. Though most of the categories are self-explanatory, some need clarification:

- **DOS prompt** means access to the DOS command line; **tree** means a functional visual tree with which you can change directories and highlight files.
- For the purposes of this features table, **memory resident** means the pop-up variety. Because of their nature, memory-resident programs do not need to be able to execute other programs; you simply pop them out, issue your commands at the DOS prompt, and pop the programs in when needed.
- **Disk drive status** includes technical information about such features as the number of cylinders and sectors.
- **System status** includes a listing of the number and type of ports and drives, type of CPU, and environment status.

Product/ Manufacturer	List price	INTERFACE: Menu driven	Command driven	DOS prompt	Point and shoot	Tree	EXECUTION CAPABILITIES: DOS commands	.COM/.EXE programs	BASIC programs	Batch files
★ **dirWORKS** Keep It Simple Software	$25.00	●	●	●	●	○	●	●	●	●
XPIP System Facilities Inc.	$29.95	●	●	●	○	○	●	●	●	●
Stilt River Shell Bob Howard	$35.00	○	●	●	●	●	●	●	●	●
Dirscan Thoughtsoft	$39.95	○	●	○	○	○	○	○	○	○
Q-DOS II Gazelle Systems	$44.95	○	●	●	●	●	●	●	●	●
The Direc-Tree Plus Micro-Z Co.	$49.50	○	○	○	●	●	●	●	●	●
QTDDLS* QCAD Systems Inc.	$49.50	○	○	●	○	○	○	○	○	○
Scout† John J. Newlin	$49.95	○	●	●	●	○	●	○	○	○
ShortCut† Mossy Rock Systems	$49.95	○	●	●	●	●	●	●	●	●
WindowDOS† WindowDOS Associates	$49.95	○	●	○	●	●	●	○	○	○
★ **X-Tree** Executive Systems Inc.	$49.95	○	●	●	●	●	●	●	●	●
Hot Executive Systems Inc.	$75.00	●	●	●	●	●	●	●	●	●
The Norton Commander Peter Norton Computing Inc.	$75.00	●	●	●	●	○	●	●	●	●
ALPS Hip-Pocket Helpers* ALPS	$79.00	○	○	●	○	○	○	○	○	○
KeepTrack Plus The Finot Group	$79.00	●	●	○	●	●	●	●	●	●
Power-TOC TOC Business Solutions Inc.	$79.95	●	●	●	●	●	●	●	●	●
1 DIR Plus Bourbaki Inc.	$95.00	●	●	●	●	●	●	●	●	●
★ **DDS2oole*** E-X-E Software Systems	$99.00	○	●	●	○	○	○	○	○	○
SNAP The Mt. Whitney Group	$99.95	●	●	●	●	●	●	●	●	●

★—Indicates Editor's Choice.

●—Yes ○—No

*These programs are standalone utilities and not shells. Therefore, the individual command is accessed at the DOS prompt

†These programs are memory resident and pop up over an application. They do not need to be able to execute another program

FEATURES									OTHER FEATURES								STATUS INFORMATION			
Single file				Multiple file with tag																
Move	Tag	Attribute	Find	Copy	Rename	Move	Delete	Attribute	Views ASCII	Views hex	Built-in editor	Prints files	Saves DOS commands	Creates menus	Creates macros	Memory resident	Available memory	Disk drive status	System status	Directory
●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	●	●	●	●
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●	●	●	●	●	●	●	●	●	●	○	●	●	○	●	○	○	●	●	●	●

We quell qualms

✓ **denotes IBM-AT compatibility.**
★ **denotes IBM-PCjr compatibility.**
CP—copy-protected, **NCP**—not copy-protected

SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

Alpha Software ... NCP
★✓Keyworks 2.0 ... $49.
★✓Alpha/three 1.0 ... 223.
Application Techniques ... NCP
✓Pizazz 1.0 ... 35.
Ashton-Tate ... NCP
✓dBase III Plus 1.1 ... call
✓Framework II 1.1 ... call
★✓Sign-Master 5.1 *(CP)* ... 149.
✓Diagram-Master 5.01 *(CP)* ... 199.
★✓Chart-Master 6.2 *(CP)* ... 229.
✓Map-Master 1.0 *(CP)* ... 239.
★✓MultiMate 3.31 ... call
✓MultiMate Advantage 3.6 ... call
Best Programs ... NCP
✓PC/Tax Cut *(1987 version for 1986 taxes)* ... 49.
Bible Research ... NCP
★✓THE WORD 3.1 *(KJV Bible)* ... 159.
★✓THE WORD 3.1 *(NIV Bible)* ... 159.
Borland International ... NCP
★✓Turbo Tutor 2.0 ... 24.
★✓Turbo Database Toolbox 2.0 ... 41.
★✓Turbo Graphix Toolbox 1.0 ... 41.
★✓Turbo Editor Toolbox 1.0 ... 41.
★✓Turbo Lightning 1.0 ... 59.
★✓Word Wizard 1.0 ... 41.
★✓Turbo Pascal 3.0 w/BCD & 8087 support ... 59.
★✓Turbo Pascal w/Turbo Tutor ... 75.
★✓Turbo Prolog 1.1 ... 59.
★✓Turbo Family Jumbo Pack ... 187.
★✓Sidekick 1.5 ... 51.
★✓Treveling Sidekick 1.0 ... 43.
★✓Traveling Sidekick w/Sidekick ... 73.
★✓Reflex 1.1 ... 87.
★✓Reflex Workshop 1.0 ... 41.
★✓Superkey 1.1 ... 41.
BPI Accounting ... NCP
★✓General Accounting C.13 ... 299.
Breakthrough ... NCP
✓Timeline 2.0 ... 239.
Broderbund ... CP
★✓Print Shop ... 35.
★✓Print Shop Companion ... 33.
★✓Graphics Library 1 ... 22.
★✓Graphics Library 2 ... 22.
Chipsoft ... NCP
★✓Turbo Tax 4.0 *(1987 version for 1986 taxes)* ... 45.
Computer Associates ... NCP
★✓SuperCalc 4 1.0 ... call
Consumers Software ... NCP
✓Spreadsheet Auditor 3.0 *(check your work)* ... 89.
Dac Software ... NCP
✓Dec Easy Port ... 19
✓Dac Easy Meta ... 26.
✓Dac Easy Payroll ... 32.
★✓Dac Easy Accounting ... 45.
Executive Systems ... NCP
✓XTREE 2.0 ... 37.
✓Hot 3.0 *(DOS utility)* ... 41.
5th Generation ... NCP
✓Fastback 5.13 ... 93.
Funk Software ... NCP
★✓Sideways 3.11 ... 39.
Generic Software ... NCP
✓Generic CADD 2.0 ... 69.
Harvard Associates ... NCP
★✓PC LOGO 2.0 ... 89.
Infocom ... NCP
✓Cornerstone 5.2 ... 59.
Lifetree ... NCP
★✓Volkswriter Deluxe Plus 1.0 ... 69.
★✓Volkswriter 3 1.0 ... 147.
Micro Education (MECA) ... CP
★✓Managing Your Money 3.0 ... 115.
★✓Managing the Market 1.0 ... 85.
Micropro ... NCP
★✓WordStar 3.31 ... 179.
✓WordStar Propak 3.31 ... 259.
✓WordStar 2000 Plus Release 2 ... 285.
Microrim ... NCP
✓R:base 5000 1.01 ... call
✓R:base System V 1.0 ... 359.
Microsoft ... NCP
✓Windows 1.03 ... 65.
★✓Multiplan 2.01 ... 119.
★✓Microsoft Chart 2.02 ... $189.
★✓Microsoft Word 3.1 ... 279.
★✓Microsoft Project 3.0 ... 239.
LANGUAGES
✓Quick Basic 2.0 ... 59.
★✓Macro Assembler 4.0 ... 97.
★✓Pascal Compiler 3.3 ... 175.
★✓Fortran Compiler 3.31 ... 229.
★✓C Compiler 4.0 ... 279.
Microstuf ... NCP
★✓Crosstalk XVI 3.61 ... 95.
✓Remote 1.3 ... 95.
Migent Software ... NCP
✓Ability 1.0A ... 65.
Monogram ... NCP
★✓Dollars & Sense 2.0 ... 105.
Nantucket Software ... NCP
✓Clipper *(Autumn '86)* ... 349.
Nolo Press ... NCP
★✓WillWriter 1.0 ... 35.
Peperback Software ... CP
★✓VP-Planner 1.3 ... 57.
★✓VP-Info 1.0 ... 57.
Personics ... NCP
✓SmartNotes 1.4 ... 49.
Peter Norton ... NCP
★✓Norton Commander 1.0 ... 39.
★✓Norton Utilities 3.1 ... 57.
Quarterdeck ... NCP
✓DESQView 1.3 ... 65.
Simon & Schuster ... NCP
★✓Webster's New World Speller 1.3 ... 39.
★✓Webster's New World Thesaurus 1.0 ... 43.
★✓Webster's New World Writer 1.01 *(includes Thesaurus & Speller)* ... 109.
Softlogic Solutions ... NCP
✓Double DOS 4.0 *(PC concurrency)* ... 33.
✓Software Carousel 2.0 ... 33.
✓Disk Optimizer 2.0 ... 35.
Software Publishing ... NCP
✓PFS First Choice 1.0 ... 97.
✓Personal Publisher 1.0 ... 109.
✓Professional Write 1.0 ... 119.
✓Professional File 1.0 ... 149.
✓Harvard Presentation Graphics A:01 ... 239.
✓Harvard Total Project Manager 1.12 ... 289.
Springboard ... CP
★✓Certificate Meker ... 34.
★✓Newsroom ... 35.
★✓Clip Art Volume 1 *(for Newsroom)* ... 19.
★✓Clip Art Volume 2 *(for Newsroom)* ... 25.
✓Newsroom•Pro *(NCP)* ... 79.
Symantec ... NCP
✓Q & A 2.0 ... call
True BASIC, Inc. ... NCP
★✓True BASIC 2.0 ... 109.
✓True BASIC Libraries ... *each* 32.
Turner Hall ... NCP
✓SQZI 1.5 *(for Lotus compactness)* ... 49.
✓Note-It 2.0 *(notes on spreedsheets)* ... 49.
WordPerfect Corp. ... NCP
✓WordPerfect Library ... 59.
★✓WordPerfect 4.2 ... 239.

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through February 28, 1987

LOTUS DEVELOPMENT CORP. ... NCP
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Do you have a problem communicating with 1-2-3? Don't feel bad, now HAL is here to lend a hand. HAL understands English, so you are both now speaking the same languaga. Tell him to "/enter Jan to Dec across in C3," and voile! The months eppear across the top like megic. HAL is the greatest thing to happen to 1-2-3 since the personal computer.

- RAM-resident, so it's always right there when you need it
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- Includes tha ability to link spreedsheets (finally!)
- Undo feature lets you change your mind

For the IBM PC, XT, or AT
(requiras 1-2-3 Rel. 1A or 2) ... $109.

For the IBM-PC (XT & AT) *Exclusively.*

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and quagmires.

TRAINING

ATI ... CP

★ ✓*SKILL BUILDER PROGRAMS*

PC-DOS	MS-DOS	DOS-REF
IBM-PC	BASIC	 *each* $33.

★ ✓*TRAINING POWER PROGRAMS*

Lotus 1-2-3	Wordperfect	dBase III Plus
WordStar	Displaywrite 3	 *each* 43.

Individual Softwares ... CP

★ ✓The Instructor II 26.
★ ✓Professor DOS 33.
★ ✓Tutorial Set *(both items above)* 49.
★ ✓Typing Instructor II 26.
★ ✓Training for Lotus 1-2-3 *(for vers. 1A & 2)* . . . 37.
★ ✓Training for Accounting 37.

Microsoft ... NCP

★ ✓Learning DOS *(for any version)* 33.

Simon & Schuster ... NCP

★ ✓Typing Tutor III 1.5 33.

EDUCATIONAL

All educational programs listed are copy-protected except where noted.

Barron's

★ ✓Computer SAT 35.

Designware *(reqs. CGA)*

★ Spellicopter *(ages 6 to adult)* 22.

Eduware *(reqs. CGA)*

★ Algebra 1,2,3, or 4 22.

Stone & Associates *(reqs. CGA)*

★ ✓My Letters,Numbers,Words *(ages 1 to 5)* . . 27.
★ ✓Kids Stuff *(ages 3 to 8)* 27.

True BASIC, Inc. ... NCP

★ ✓Calculus 32.
★ ✓PreCalculus 32.
★ ✓Trigonometry 32.

RECREATIONAL

All recreational programs listed are copy-protected except where noted.

Blue Chip

★ ✓Managing for Success *(American Dream)* . 36.
★ ✓Millionaire 36.

Electronic Arts ... NCP

★ ✓Starflight *(reqs. CGA)* 32.

Hayden Software

★ Sargon III *(highest rated Chess program)* . . 32.

★ ✓**Infocom ... NCP**

Enchanter	the Witness	Planetfall
Leather Goddesses		Hitchhiker's Guide
Moonmist	Zork I	*each* 24.
Zork II	Zork III	*each* 27.

Invisiclues (hint booklets). Specify game . . . 6.

Microleague Sports *(reqs. CGA)*

★ ✓Microleague Baseball 25.

Microprose *(reqs. CGA)*

★ F-15 Srike Eagle 22.
★ Silent Service 22.

Microsoft *(reqs. graphics brd.)*

★ ✓Flight Simulator 2.12 32.

Mindscape *(reqs. graphics brd.)*

✓Balance of Power *(avoid nuclear war)* 30.

1Step Software *(reqs. CGA)*

★ ✓Golf's Best *(Pinehurst or St. Andrew's)* 19.

Parlor Software

★ ✓Bridge Parlor *(best Bridge simulation)* 49.

Sierra On-Line *(reqs. CGA)*

★ ✓Space Quest 32.
★ ✓King's Quest II 33.
★ ✓King's Quest III 33.

Simon & Schuster

★ ✓Star Trek/Kobayashi 27.

Spectrum Holobyte *(reqs. CGA)*

★ ✓Orbiter *(Shuttle simulation)* 27.
★ ✓GATO 27.

Sublogic *(reqs. graphics brd.)*

★ ✓Jet 33.

XOR ... NCP

★ ✓NFL Challenge *(be the coach)* 79.

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HARDWARE

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AST Research ... 2 years

All boards listed (except Piggyback) include a FREE copy of DESQView.

SixPakPlus 64k C/S/P $169.
SixPakPlus 384k C/S/P *(fully populated)* . . . 209.
SixPakPremium 256k C/S/P *(upgrades to 1 Mb or 2 Mb w/Piggyback)* . . 319.
SixPakPremium Piggyback Board 256k . . 189.
✓Advantage Premium 512k S/P *(upgrades to 1 Mb or 2 Mb w/Piggyback)* . . 469.
✓Advantage Premium Piggyback 512k 289.
RAMpage! 256k *(upgrades to 2Mb)* 289.
✓RAMpage! AT 512k *(upgrades to 2Mb)* . . . 449.
✓RAMpage EGA 512k *(for the IBM-AT)* 699.

AST Premium series boards and RAMpage! boards support EMS and fully support EEMS.

Amdek ... 2 years

✓Video 310A mono monitor *(amber)* 159.
✓Color 722 - EGA compatible 499.

Compucable ... lifetime

✓Smartmodem-to-AT cable *(9 feet)* 19.
✓15-foot Parallel Printer cable 27.
✓2-Position *(AB switch box)* 39.
✓3-Position *(ABC switch box)* 65.

Cuesta ... 1 year

✓Detasaver 400 Watt *(backup power unit)* call

Curtis ... lifetime

ACCESSORIES

✓Printer Stand 18.
★ ✓Universal System Stand 25.

CABLES

Smartmodem-to-PC Cable *(9 feet)* 17.
✓Keyboard Extension Cable *(3 to 9 feet)* 27.
✓Extension Cables for IBM Mono Display . . . 33.
✓Printer-to-IBM cable *(9 feet)* 17.

SURGE SUPPRESSORS

★ ✓Safestrip *(6 outlets)* 21.
★ ✓Diamond *(6 outlets)* 29.
★ ✓Diamond-Plus *(w/FAX & modem protection)* 41.
★ ✓Emerald *(6 outlets; 6 ft cord)* 38.
★ ✓Sapphire *(3 outlets; EMI/RFI filtered)* 47.
★ ✓Ruby *(6 outlets; EMI/RFI filtered; 6 ft cord)* . . . 55.
★ ✓Ruby-Plus *(w/FAX & modem protection)* 65.
★ ✓Command Center SPECIAL 79.

DCA ... 1 year

✓Irma *(3270 emulation board)* 729.

Epson ... 1 year

✓EX-800 printer *(80 col., 300 cps)* 499.
✓EX-1000 printer *(136 col., 300 cps)* 599.
✓*NEW* FX-286e *(136 col., 200 cps)* 539.
✓*NEW* FX-86e printer *(80 col., 200 cps)* 389.
✓LX-86 printer *(80 col., 120 cps)* 249.
✓LQ-800 printer *(80 col., 180 cps)* 549.
✓LQ-1000 printer *(136 col., 180 cps)* 759.
✓LQ-2500 printer *(136 col., 324 cps)* 1089.
✓*Printer-to-IBM cable (6 feet)* 15.

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Everex ... 1 year
- Evercom II 1200 Internal Modem $129.
- Evercom II 2400 Internal Modem 235.

Both modems above include BitCom software.

5th Generation ... 6 months
- Logical Connection Print Buffer 256k 319.

Hayes ... 2 years
- Smartmodem 1200 389.
- Smartmodem 1200B *(w/Smartcom II)* 349.
- Smartmodem 1200B *(no software)* 319.
- Smartmodem 2400 589.
- Smartmodem 2400B *(w/Smartcom II)* 529.
- Smartcom II 2.1 *(software)* 89.

Hercules ... 2 years
- Hercules Color Card 159
- Hercules Graphics Card Plus special

Intel ... 5 years

Above Board PC 64k *(upgrades to 2 Meg)* .. call
- Above Board AT 128k *(upgrades to 2 Meg)* .. call

Above Board PS-PC 64k C/S/P call
- Above Board PS-AT 128k S/P call
- Inboard 386/AT call

8087 *(for IBM-PC & XT)* 119.

8087-2 *(for 8 Mhz PC compatibles)* 169.
- 80287 *(for IBM-PC AT & XT 286)* 195.
- 80287-8 *(for 8 MHz AT compatibles)* 259.

Kensington Microware ... 1 year
- * Masterpiece 94.

key tronic ... 90 days

5151 keyboard *(deluxe)* 169.

Kraft ... 1 year
- Joystick Adapter Card 29.
- *New!* 3 Button Joystick 33.

Microsoft ... 1 year
- Microsoft Bus Mouse 6.0 119.
- Microsoft Serial Mouse 6.0 129.

Mouse Systems ... lifetime
- PC Mouse with PC Paint+ 127.
- Bus Mouse with PC Paint+ 127.

NEC ... 2 years
- Multisync monitor *(EGA compatible)* 589.

NSI Logic ... 3 years
- Smart EGA 299.

Orchid Technologies ... 2 years

Tiny Turbo 286 445.
- PC Turbo 286e w/1 Meg 739.

Turbo EGA 589.

Princeton Graphics ... 1 year
- MAX-12E Amber monochrome monitor ... 179.
- * HX-12 RGB monitor *(690 x 240)* 449.

Quadram ... 1 year

Expanded Quadboard C/S/P

384k *(fully populated)* 179.
- Microfazer Printer buffer 64k *(parallel)* 159.
- Microfazer II Printer buffer 64k 249.
- QuadEGA+ *(half-card)* 349.

SMA ... 30-day money-back guarantee

PC-Documate Keyboard Templates:
- DOS/Basic 3.0-3.1
- Lotus 1-2-3
- Symphony
- dBase III
- WordStar
- WordStar 2000
- MultiMate
- WordPerfect

..... *each* 12

Toshiba ... 1 year
- P321 S/P printer *(80 col., 216 cps)* 519.
- P351 S/P printer Mod 2 *(136 col., 288 cps)* 1049.

Toshiba T1100 PLUS Laptop Computer call

Toshiba T3100 Laptop Computer call

Tseng Labs ... 1 year
- EVA 480 *(supports 640x480 resolution, includes drivers for Lotus 1-2-3 ver. 1A)* 399.

Video 7 ... 2 years
- VEGA *(half-card)* 329.
- VEGA Deluxe *(supports 640x480)* 399.

DRIVES

I2 Interface ... 1 year

20 Meg Hard Drive Card *(85 ms)* 429.

IOMEGA ... 90 days
- Bernoulli Box 20 Meg w/PC2 card 1849.

10 Meg cartridge 57.
- Bernoulli Box 40 Meg w/PC2 card 2449.
- PC2B (Bootable) Card 229.

20 Meg cartridge 79.
- Bernoulli Plus 40 Meg *(w/80 Meg hard drive and PC2W controller)* 3799.

Mountain Computer ... 1 year

Drive Card 20 Meg *(80 ms)* 519.

Drive Card 30 Meg *(78 ms)* 599.

Seagate ... 1 year

20 Meg Internal Hard Drive *(w/Western Digital controller and cables, 65 ms)* 389.

30 Meg Internal Hard Drive *(w/Adaptec RLL controller and cables, 65 ms)* 489.

Tandon ... 1 year

New Business Card 20 Meg *(85 ms)* 399.

TEAC ... 1 year

PC, XT 360k Drive *(5¼" half-height)* 109.

Toshiba ... 1 year

PC, XT 360k Drive *(5¼" half-height)* 109.
- AT 360k Drive *(5¼" half-height)* 117.

Western Digital ... 1 year

File Card 20 Meg *(w/XTREE, 80 ms)* call

MEMORY

64k Upgrade Set *(150 ns, set of 9)* 15.
- 256k Upgrade Set *(150 ns, set of 9)* 35.

DISKS

All disks have a lifetime warranty.

DS/DD Disks for the PC & XT (40 TPI).
- * Verbatim Datalife *(10 disks per box)* 15.
- * Maxell MD-2 *(10 disks per box)* 19.

DS/High Density Disks for the AT (96 TPI).
- Fuji *(10 disks per box)* $ 27.
- Verbatim *(10 disks per box)* 29.
- Maxell *(10 disks per box)* 34.

3½" Double-sided Diskettes *(720k)*

Verbatim *(10 disks per box)* 26.

Sony *(10 disks per box)* 26.

MAXELL *(10 disks per box)* 26.

3M *(10 disks per box)* 27.

MISCELLANEOUS

Automation Facilities
- * Floppiclene Disk Drive Cleaner 18.

Floppiclene Refill *(ten cleaning disks)* 10.
- * **Compuserve Information Service**

(includes subscription, manual, $25 usage credit, monthly publications) 24.
- * **Dow Jones** Membership Kit 24.

Environmental Software
- Nylon Computer Covers PC, XT or AT 20.

Innovative Concepts
- * Flip n' File 50 *(holds 50 disks)* 16.
- * Flip Sort *(holds 70 disks)* 15.

PC Connection
- * Computer Toolkit *(all the tools you need to go with your PC in a software style binder)* 29.

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- We accept VISA and MASTERCARD
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- 120 day limited warranty on all products.*
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ing the command and its parameters at the DOS prompt. Often the response is immediate and can be redirected to a file for future manipulation, or it can be piped to another command. Unfortunately, the manual skirts the issue completely. Because of this omission, the novice or intermediate user may find the utilities less productive than will the power user.

Also, while the utilities add functionality, they do not always work as you would hope or expect. For example, because the move command (MV.COM) does not accept wildcards, you cannot use it to mass move files. Nor can you enter a command such as MV \WP\TEXT.ASC and expect the file to be brought to the default directory. A few of the other programs, such as Copyhide, which makes hidden copies of files, do not trap errors properly. If you enter, let's say, COPYHIDE TEXT.ASC TEXT.ASC, the program doesn't perform the operation and doesn't inform you of the error.

■ While *ALPS HIP-Pocket Helper*'s utilities add functionality, they do not always work as you would hope or expect.

Of more concern, though, is the Clean-up command, which erases files and removes directories in one fell swoop. It does not prompt you for confirmation. As a result, you may find yourself using *The Norton Utilities*.

Most of the utilities work well. Diskerrs, for example, reads your drive sectors and reports the number of errors and the location of any bad sectors in cylinder/head format. The KB utility, an easy-to-learn macro program, assigns keystrokes to the function keys and any other key with Alt, Ctrl, and Shift. The textfile-oriented utilities—which allow you to get a line count, collapse tabs, indent lines, and search-and-substitute for string patterns—are bug-free and, when combined with *ALPS*'s directory command, DI, facilitate document manipulation. There are also utilities to record application time usage, verify the readability of all files on a logical drive, set communication parameters, chirp the speaker, and dump the contents of a file in hex or ASCII.

Overall, these utilities need better error-trapping capabilities and a better manual. But if you are willing to experiment, they will enhance your productivity.

—Vincent Puglia

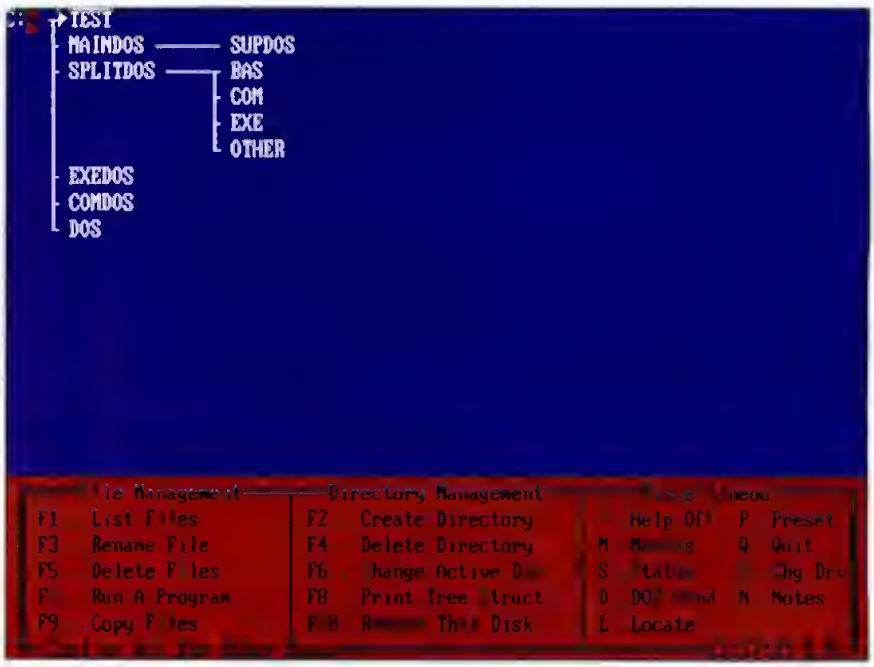
The Direc-Tree Plus

Power and flexibility—that's what Micro-Z Co.'s *The Direc-Tree Plus* offers. Not only does it provide virtually every feature and command you need in a DOS shell, including macro and menu generators and an editor, but its interface is extremely easy to learn and use. Whether you prefer point-and-shoot menus or command-driven programs, you will find something to like. The only disappointment is the editor.

Installing *The Direc-Tree Plus* is as simple as copying the files to your hard disk and running a customization program. Besides allowing you to configure the program to your system, customization permits you to install the program's resident editor or your own word processor as the default editor. When you first run the program, it creates a log of the drive's directory structure and uses it for all of its path information. Because of this, the documentation suggests that you do not alter the structure outside of the program. If you do, you can rescan the drive.

The main screen includes a functional visual tree and a collapsible command window; two other windows are available through the Ctrl and Alt keys. You issue most commands with the function keys. Execution is usually a process of pointing to the directory or file and hitting the Return key. When executing commands that operate on files, the program replaces the tree with a list of the directory's files. Many of the commands make use of a feature that allows you to search the drive for the target directory or file.

The Direc-Tree Plus enables you to move, copy, and delete files individually



The Direc-Tree Plus *utilizes a variety of technologies for its interface, including a functional tree. When you need to perform operations that require highlighting files, the auto-path feature can come into play. The Notes command can be used to append descriptions to filenames and maintain short memos.*



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The Direc-Tree Plus
Micro-Z Co.
4 Santa Bella Rd
Rolling Hills, CA 90274
(213) 377-1640
List Price: $49.50, plus $5 shipping and handling.
Requires: 64K RAM, one disk drive, DOS 2.0 or later. Hard disk drive is recommended.
In Short: A flexible and powerful program that enhances your file management capabilities and offers macros, menus, and an editor. You have to go far to find a better one. Not copy protected.

CIRCLE 673 ON READER SERVICE CARD

or en masse. You can also create or remove directories, send escape code sequences to your printer, back up files, and execute other programs. Other perks are the ability to define ten macros and 100 user-definable menu options for executing programs and macros, and a Note command that attaches a two-line description to file names, thus circumventing DOS's eight-character maximum. *The Direc-Tree Plus* is extremely flexible when you need to execute programs. You can use the Run command, the DOS prompt, a menu, or a macro. Unfortunately, each of the options forces you to return immediately to the utility; an option of staying at the DOS prompt would have been nicer.

Although *The Direc-Tree Plus*'s editor, DTEDIT, is *WordStar*-compatible, it lacks some of the commands, most notably those for block moves. If you attempt to use them, the program may exhibit some trouble with the screen updating. Also, the cursor keys do not work as they do in *WordStar*; the Home and End keys, for example, bring you to the start and end of a line rather than the top and bottom of the screen. One major advantage for *WordStar* users in DTEDIT's subdirectory support; essentially, you no longer need to keep your text and program files within the same directory. Another nice feature is the implementation of the help screen. As you are working, it automatically jumps from the top of the screen to the bottom and vice versa.

Micro-Z's *The Direc-Tree Plus* is definitely one of the better programs on the market today, especially now that it has joined the ranks of non-copy-protected programs.—**Vincent Puglia**

Dirscan

Of the DOS shells reviewed in this issue, Thoughtsoft's *Dirscan* (Directory Scan Utility) is the least ambitious. Its features are few and simple: scanning directories for files, printing the directories, and creating batch files. You can locate files by name, extension, date, time, size, attribute, or starting cluster and narrow the selection by specifying criteria with Boolean operators. In addition, you can direct the program to scan more than one directory at a time by having it execute a user-defined Paths file. While the program delivers on its promises, its narrow scope makes it too limiting for most users.

Dirscan's two screens—one for file selection and the other for batch file control statements—are of the fill-in-the-blanks variety. You either enter data or hit the Return key until the command is executed.

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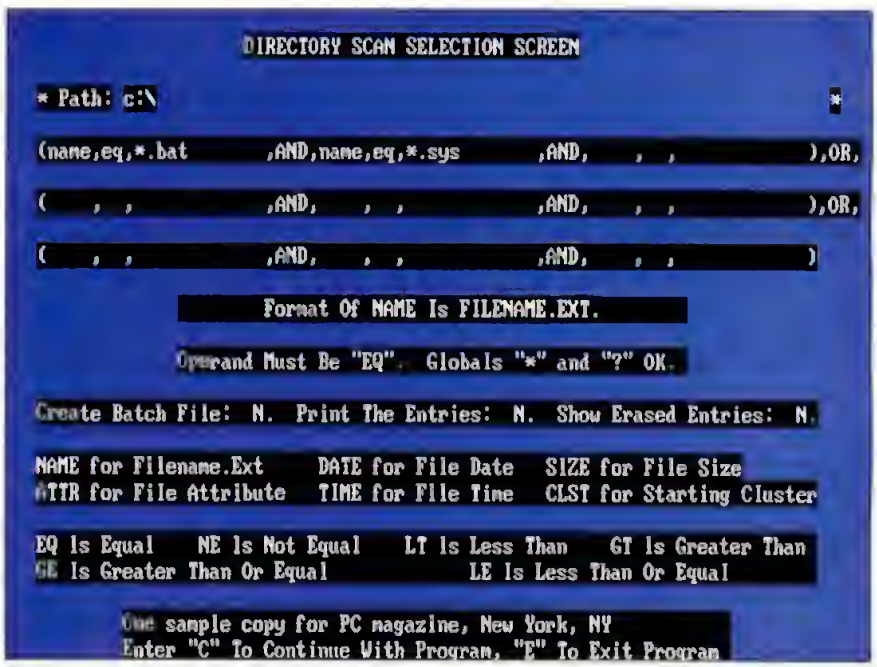


Dirscan, Version 1.01
Thoughtsoft
P.O. Box 22306
Houston, TX 77227
List Price: $39.95
Requires: 128K RAM, one disk drive, DOS 2.0 or later.
In Short: An unambitious directory scan program that also creates batch files; its interface makes patience a virtue. Not copy protected.

CIRCLE 670 ON READER SERVICE CARD

While obviously illegal entries are buzzed immediately, the lack of a full-screen editor prevents you from backtracking and changing any information that the program has already accepted.

For each lookup, you need to enter "C" for Continue before entering the directory path or Paths filename—an ASCII file containing the various paths you want searched. You then enter as many as nine selection criteria by using combinations of Boolean ANDs and ORs. A typical set of



Dirscan's fill-in-the-blank screen is indicative of its homegrown background. Its lack of a full screen editor, poor error-trapping (hitting Esc wreaks havoc on the screen but not the program), and limited capabilities make it difficult to use.

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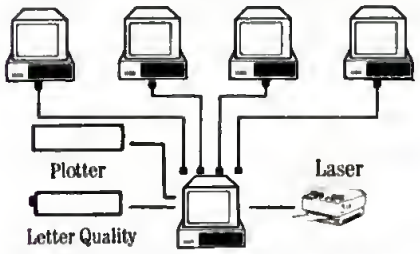
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EP 11	*EasyPRINT* disk & manual (3½" disk $84.95)	$ 74.95	___	$ ___
EP 12	*EasyPRINT* 30' cable	$ 49.95	___	$ ___
EP 13	COM2 serial port expansion board, two ports	$ 219.95	___	$ ___
EP 14	COM6 serial port expansion board, six ports	$ 489.95	___	$ ___
EP 15	Custom length cables, call for quote			
	CA res. add applicable sales tax			$ ___
	Shipping charge USA $10.00, Other $20.00			$ ___
	TOTAL ORDER			$ ___

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selection criteria might specify the file entry field, the value to check against, and the type of comparison. For example, you can scan for any files created or altered on January 31, 1986, with the filename TEMP by issuing the command NAME, EQ, TEMP.*, AND, DATE, EQ, 01-31-1986. There are a total of six operands, and they run the gamut from EQ (equals) to GT (greater than).

While the entire process is extremely straightforward, there are times when you wish *Dirscan* did more—even within its narrow confines. For example, when searching by date, why should the user have to insert the millenium and century numbers? Even DOS doesn't require that. Equally bothersome is entering attribute values as a two-digit hexadecimal number between 00 and FF—many people do not always have the DOS manual on hand for reference. Finally, why should you copy EDLIN.COM into the *Dirscan* directory as the documentation suggests? Can't the program locate the editor on its own?

■ As it stands, Thoughtsoft needs to rewrite the *Dirscan* interface to use point-and-shoot technology.

The batch file creation option is even more tedious than the directory search procedure. Rather than simply entering the DOS statements, you also need to enter what the program calls a control statement code. True, you can use the program's wildcards, but that also means you have to learn them.

Dirscan may allow you to scan more than one directory at a time, but its overall performance is not really worth either the time or the money you need to invest. As it stands, Thoughtsoft needs to rewrite the interface to use point-and-shoot technology, simplify the batch creation so it does not use codes, provide a full-screen editor for both screens, and add features. The worst aspect of this program, though, is its support—or lack of it. Because there is no phone number for Thoughtsoft, you are relegated to writing a letter, much as we did when we discovered the first copy of the program did not run on DOS 3.0 or later.—**Vincent Puglia**

dirWORKS

Last year *X-Tree* did the best job combining ease of use and power. Keep It Simple Software's new *dirWORKS* has similar capabilities. The interface—one main screen and pop-up, task-oriented windows—is straightforward. You select most options and files simply by pointing or typing the first letter.

The program has but two help screens: the keyboard layout and the command menu. While I personally prefer a command bar along the bottom or top of the screen, *dirWORKS* implements a pop-up command menu bar. You access the menu by hitting the Slash key—something *1-2-3* users will find second nature. Most of the commands are mnemonic, the most troublesome for me being "M" for Mark multiple files—move is under "R" for Rename/move (most other programs use "T" for Tag). Once you are more familiar with the commands, you can skirt the menu and simply enter the first letter.

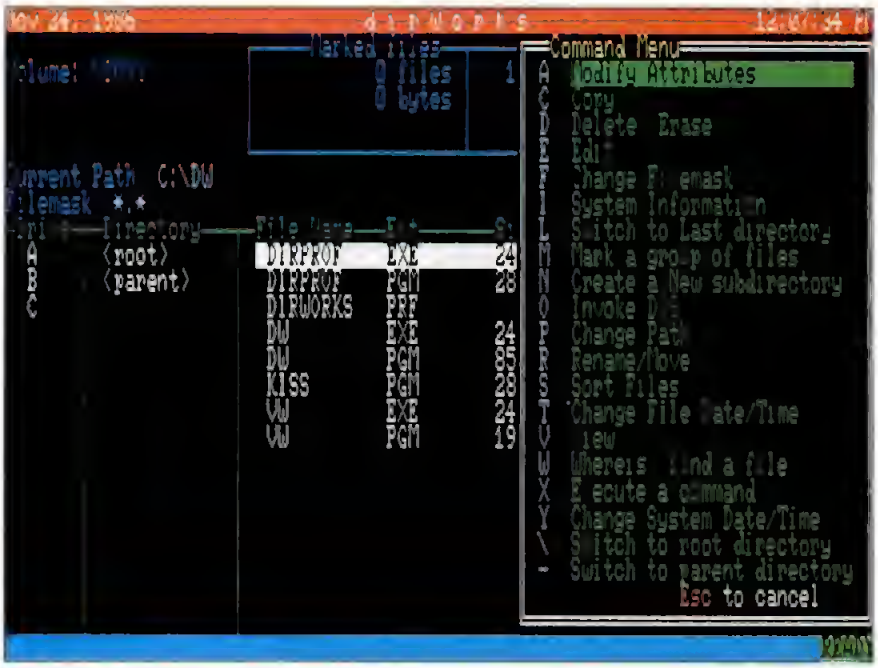
dirWORKS, one of the friendliest programs in this series of reviews, provides one-keystroke entries for the most-often-used operations. While many other programs allow you to return to the previous directory you were in by hitting one key,

FACT FILE

DIRWORKS

dirWORKS
Keep It Simple Software
580 5th Ave.
New York, NY 10036
(800) 848-8909
(212) 398-1286
List Price: $25, plus $5 shipping and handling.
Requires: 256K RAM, one disk drive, DOS 2.0 or later.
In Short: An excellent shell that uses pop-up menus and provides all of the power you need without imposing on your work habits. Not copy protected.

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The dirWORKS *interface may not offer a tree, but its use of the slash (/) to call up the command window (on the right) will be appreciated by* 1-2-3 *users.*

dirWORKS also permits access to the root and parent directories in the same manner. Perhaps more useful, the filemask can be reset to *.* simply by hitting the "*" key. Finally, you can reconfigure *dirWORKS* from within the program itself simply by hitting the F8 key.

The included file management features permit all of DOS's commands, such as copy and delete, as well as the ability to move and tag files. You tag files by calling up the appropriate screen and marking either all of the files or only those with a designated pattern. You can also tag files by date and time, a very useful feature if you are in the habit of doing backups. You change the logged-on drive or directory by highlighting it with the cursor key and hitting the Return key. The scanning time is almost instantaneous.

■ *dirWORKS* is the program to buy if you are looking for an excellent price/performance ratio.

dirWORKS's other features include an information screen that displays the type of system (PC, XT, etc.), the number and type of drives and ports, and the amount of installed and free memory; a handy format option that simplifies formatting 360K-byte disks on a 1.2-megabyte drive; and the ability to execute programs with parameters.

The only problem I had was with the whereis command when I tried using it on a system with a Corvus TLC hard disk/tape backup unit. Evidently, the unit's boot ROM is not totally compatible with IBM's and when it intercepts legal DOS calls, it does not always hand them over as it should. As a result, the program could not search the drive's directory. When I used it on an IBM XT system, it did not display any problems at all and its performance was more than acceptable, pausing at each find and allowing me to execute files it had found. The people at Keep It Simple Software stated that they would call Corvus and fix the problem. At any rate, the bug seems to be limited to that particular unit.

dirWORKS may not have a flashy name, but it is the program to buy if you are looking for ease of use and an excellent price/performance ratio. As I said before, this program is what *X-Tree* was last year: powerful, flexible, and easy—get it.

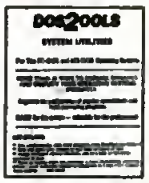
—Vincent Puglia

DOS2ools

E-X-E Software Systems' *DOS2ools* is perhaps the best set of standalone utilities I have ever run across. The programs are both powerful and flexible, but their greatest strength lies in a sense of intelligence that is not usually displayed by other utilities. They show an awareness of how people actually work. Also, unlike the ALPS and QCAD programs, *DOS2ools* includes an optional user interface that smooths the learning curve and simplifies the operation of the individual utilities. Finally, the *DOS2ools* documentation, although a bit technical in places, more than adequately explains the various commands with numerous examples and helpful hints.

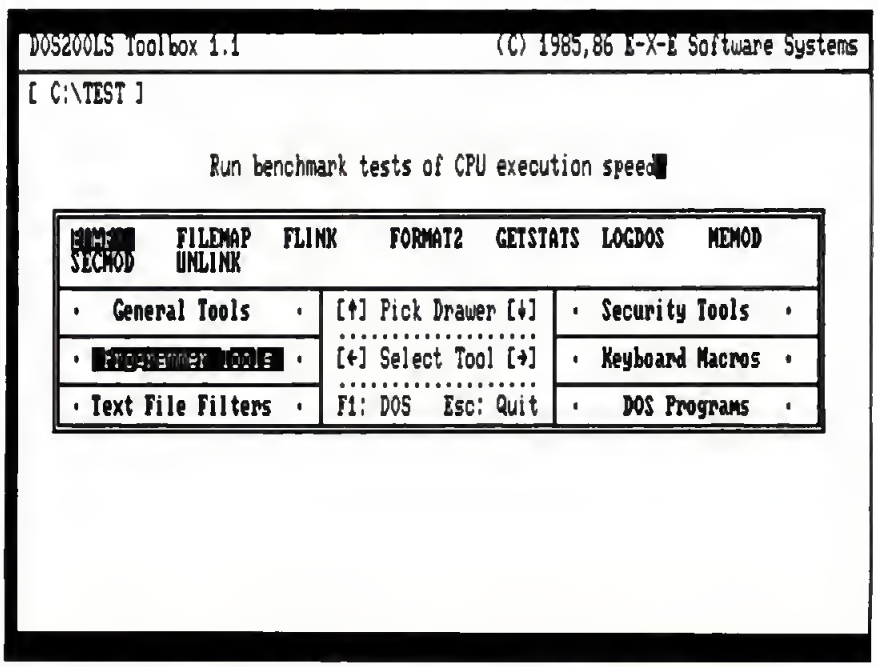
While you can evoke individual commands at the DOS prompt, E-X-E also supplies a shell program that provides a common interface. The utilities are grouped into six drawers, such as Programmer's Tools and Text File Filters, and the drawer's contents are displayed at the top. You move from one drawer to another with the cursor keys and select a command by highlighting it and hitting the Return

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***DOS2ools*, Version 2.2**
E-X-E Software Systems
8855 Atlanta, #298
Huntington Beach, CA
92646
(714) 662-2535
List Price: $99
Requires: 128K RAM, one disk drive, DOS 2.0 or later.
In Short: An excellent collection of 43 robust and intelligent utilities that will enhance not only DOS's performance but yours as well. Not copy protected.

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While you can call up any of the DOS2ools *programs directly from the command line, the shell interface is simple and unobtrusive enough for novices. When a command is highlighted, a description of the action is provided at the top.*

THE TRUE DOS SHELL

Throughout these reviews, the term "DOS shell" has been bandied about to connote a utility program that provides a friendlier and more common interface than DOS's own. In some circles, the term has a stricter connotation, meaning a program that envelops the disk operating system. By that definition, PC-DOS is a DOS shell. If that is true, then the programs in the main article buffer the user from DOS and do not actually provide a shell for DOS.

Semantics aside, though, ESP Software Systems' *Command Plus* is a true shell in that it directly replaces PC-DOS's COMMAND.COM and offers more services.

Command Plus is the steak-and-potatoes man's DOS shell. While other programs attempt to protect the user from the enigmatic DOS prompt, *Command Plus* flaunts it. Where other programs attempt to simplify commands by either ignoring switches or including them as separate menu choices, *Command Plus* gives you more switches for everyday use. Nor do the extra switches mean you have more to learn, since every command allows a "/?" switch that will list the applicable switches. Finally, instead of the limited batch file capability supplied by DOS, *Command Plus* comes with SCRIPT, an interpretive command file processor that supports subroutines.

On the surface, *Command Plus* resembles PC-DOS: you enter commands at the prompt and execute programs by hitting the Return key. Once you delve into it, though, you may begin to wonder what Microsoft and IBM were thinking of during the development stage. For example, editing a command in DOS has always been a chore. You either alternate between hitting the F1 key and the Ins key or you rewrite the entire line. With *Command Plus*, you no longer have to hit the Ins key for every character you insert on the command line; you hit it once and the insert function stays on—elegance and productivity. Another difference in the command line environment is the ability to scroll through previously executed commands simply by hitting the Cursor Up and Cursor Down keys. If you have ever issued the same sequence of commands over and over, you will appreciate this new-found capability.

The usual DOS commands are equally enhanced. For instance, the copy command is similar to DOS 3.2's XCOPY in that you can copy a directory's files and those of its subdirectories and have the command automatically create any nonexistent subdirectories. Instead of DOS's Type, *Command Plus* offers Browse, which not only displays one screen at a time but also allows you to perform string searches. The delete command allows you to set a switch that will delete not only a directory but also its subdirectories. Needless to say, this is a potentially dangerous feature, especially at 3:45 in the morning; however, danger is the price you pay for power.

Command Plus's strongest feature, though, may be SCRIPT. In addition to four different types of operators—assignment, math, conditional, and Boolean—SCRIPT offers a block-structured language similar to Pascal's. You can declare integers and string variables; control the flow of your program with For/While loops, Case, Call, and Goto statements; position and display characters to the screen; perform string operations; and access the environment.

Command Plus may not be for the casual user, but its power and flexibility are sure to attract a following. If you are tired of waiting for DOS 10.*x* and find DOS 3.*x* light, *Command Plus* should satisfy you.—**Vincent Puglia**

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Command Plus
ESP Software Systems Inc.
11965 Venice Blvd., #309
Los Angeles, CA 90066
(800) 992-4ESP
(213) 390-7408
List Price: $79.95
Requires: 384K RAM (suggested), one floppy disk drive, DOS 2.0 or later.
In Short: An extremely impressive COMMAND.COM replacement, offering an extended, Pascal-like batch language and access to previously executed commands. Not copy protected.

CIRCLE 675 ON READER SERVICE CARD

key. Help consists of short one- or two-line descriptions and appropriate prompts.

Most users will find two of the commands in the General Tools drawer—Move and Where—invaluable. While most move commands require you to state the source and target directories, *DOS2ools*'s Move operates with the minimum amount of information. For example, the command MOVE \WP*.TXT will automatically transfer the files *.TXT to the default directory. If the files already exist in the target directory, you are prompted for confirmation. A great future enhancement would be batch file support. The Where command, *DOS2ools*'s file finder, is just as simple to use, requiring only the command and the name of the file to be located. If you do not include a path, the search begins with the current directory and searches downward into any subdirectories.

Also in the General Tools drawer are commands for running *1-2-3*, displaying the size of files in a directory, and showing statistical information about the system's memory, such as the amount of RAM and the program's loading address. A Color command, which requires ANSI.SYS, enables you to alter foreground and background colors as well as video attributes. The Files command substitutes for DOS's DIR /w command and enhances it by separating the files from the subdirectories.

In the Programmer's Tools drawer are commands for linking and unlinking files and for altering disk and RAM contents. Since any of the foregoing utilities can wreak havoc, you'd best proceed very

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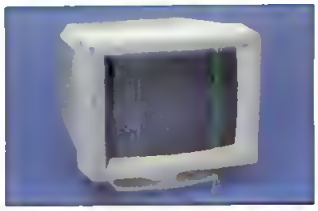
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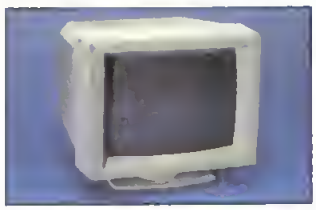
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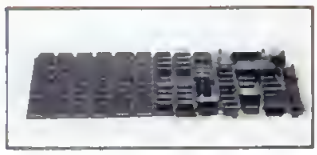
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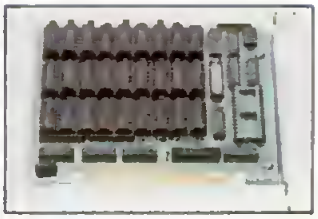
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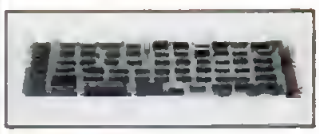
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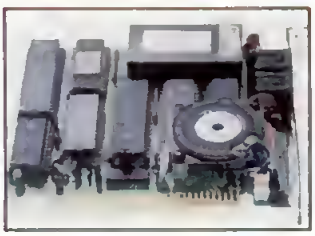
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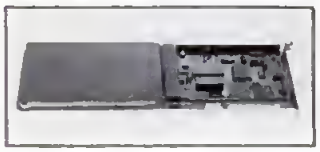
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slowly when you are using them.

Bmarx, a new utility included in *DOS2ools*, Version 2.2, benchmarks your CPU's performance. Besides testing the microprocessor's speed with in-line, loop, and multiply operations, it also calculates the mean and average and displays the number of wait states. If you do not have a copy of PC Magazine Labs benchmark tests, Bmarx is an excellent alternative.

DOS2ools provides a number of other utilities, including some for encrypting files, creating macros, excising columns from text, and getting time usage. In each case, the error trapping is excellent and a lot of attention has been given to ensuring ease of use. For example, two of the commands, Hide and Unhide, are simple batch files that do little more than call Attrib, another program, and change the hidden attribute. Still, they allow you to accomplish this without remembering the switch.

DOS2ools provides the minimum in front-end overhead while offering the maximum in power, performance, and error trapping. You may not use all 43 utilities in the package, but you are certain to love the ones you do. If you have to get one program and you aren't afraid of the DOS prompt, get *DOS2ools*.—**Vincent Puglia**



Unlike X-Tree, *Executive Systems' other shell,* Hot *relishes menus. This screen is only one of the many accessed through menus. While* Hot *may be configured for novices, an experienced user is needed to set it up.*

Hot

Hot, Version 3.0, may find some followers, but I personally prefer the old *X-Tree* interface, which is simple, clean, and friendly enough for virtually anyone to learn. For some reason, Executive Systems decided it needed a "user-friendly" menu-oriented program, and *Hot* is the result. (I put quotes around "user-friendly" because I believe the more overhead you have in your front end, the less friendly it becomes.)

Unlike *X-Tree*, *Hot* is a blend of menus, function keys, and commands. Some of the menus are already created, others are created at the touch of a button, and still others are created manually. While menus have their place, *Hot*'s menus seem to confuse rather than to orient. Perhaps this is because you always need to return to the opening menu or because of the menu's aesthetics (or lack thereof)—whatever the case, I miss *X-Tree*'s simple graphic tree. What I get instead is a series of menus I have to traverse in order to find the command I need.

Hot's automatic menu builder scans your disk for executable files, compares them against those listed in a data file, and then builds the necessary menus. While the process is relatively fast and seems user friendly, it is far from foolproof. For instance, it decides that any program called PT.EXE is Peachtree Software's word processor. Furthermore, any executable files that *Hot* does not recognize are automatically dumped into a miscellaneous bucket. As a result, if you have an excessive number of executable files or unique batch file names, your miscellaneous menu tends to contain more files than the 101st Airborne has paratroopers.

Because the problems arise from an assumption about filenames, you can remedy the situation by editing the HB.DAT file so that it correctly identifies your specific files. While the actual process is not very difficult, it is tedious and should not have been necessary in the first place. A better solution would have been for *Hot* to allow you to rearrange and rename the menu options or to have asked for confirmation before actually building them.

Of course, there is a third alternative: you can always hit an Alt-C combination and pop up a command-line interface. Once you get through the menus to the actual commands, *Hot* performs at least as well as *X-Tree* and in some cases even bet-

PC MAGAZINE FACT FILE



***Hot*, Version 3.0**
Executive Systems Inc.
15300 Ventura Blvd., #305
Sherman Oaks CA 91403
(800) 634-5545
(800) 551-5353 (in Calif.)
List Price: $75
Requires: 256K RAM, one disk drive, DOS 2.1 or later. 312K RAM and DOS 3.1 are recommended.
In Short: A shell that has features galore but suffers from too many menus and lacks a sense of cohesiveness. Not copy protected.

CIRCLE 662 ON READER SERVICE CARD

ter. The Find File, Attribute, and standard DOS commands are all there and function much the same. New features include menus for printer and communication port setups, a calendar, and an editor.

The editor is *WordStar*-like and more complete than the one found in *SNAP*, though it also leaves you at the top of the paragraph when reformatting. One nice touch is the implementation of a *1-2-3*–like command window. Whenever you hit a control character, such as ^O, a window appears that contains all available character combinations. At that point you can either hit the letter you want or scroll through them and read the short description message.

I discovered only one bug when I tested *Hot*—it cannot run *WordStar*'s SpellStar. Every time I tried running a spelling check, there was a "Divide overflow" message and I was returned to the *Hot* menu. According to the technical-support people, a fix has already been written and is being sent out to all registered users.

Novice users may find *Hot* easy to use—once they reset their menus—but the power user is definitely going to find that it gets in the way. Then again, Executive Software says that future versions of *Hot* will offer alternative environment capabilities, and you will be able to pop in any program from anywhere. At present, though, *Hot* leaves me lukewarm.

—Vincent Puglia



KeepTrack Plus *divides the main screen into a tree window and a file area. Command windows are popped in with F10 and Shift-F10. The tree provides nagivational ability, and you highlight the files when executing commands.*

KeepTrack Plus

KeepTrack Plus is an appealing, no-nonsense program that offers comprehensive file management and disk backup at a reasonable cost. Actually, there are two versions of the product, both worth mentioning. For $39 you can get *KeepTrack*, which offers file management without the backup. *KeepTrack Plus* adds a nicely written backup utility to the basic program and another $40 to the price tag. Either one could go a long way toward organizing a hard disk that is getting out of hand.

Ideally a DOS shell should help you do your work by organizing your files, staying in the background until needed, and not forcing you to learn a new series of commands. *KeepTrack Plus* succeeds admirably on all counts. The product comes on a single, non-copy-protected disk and doesn't require any special installation procedure. Simply copy the .EXE file onto your disk and type KT to boot the program.

The user interface is much like *X-Tree*'s but with a little less information initially displayed on-screen. The top portion shows the tree structure of the logged disk, while the bottom portion displays the files in the highlighted directory. Indicators for percentage full, number of files, and number of bytes are also displayed. Like other programs of this ilk, the status and file displays are continuously updated as you move your cursor through the directory tree. Pressing F6 will turn off the tree window, causing the file display to flow up and fill the full screen. Pressing F6 a second time will toggle back to the split screen display.

Although only limited help is available on-line, it is unlikely that anyone would have trouble with *KeepTrack Plus*'s file management capabilities. Pressing F10 pops up a window showing the function key assignments, and holding down the Shift key will show the ten commands accessed through that combination. Most commands are obvious or at least self-prompting; a box at the bottom of the screen will prompt for additional actions as necessary.

KeepTrack Plus allows you to point and shoot to control numerous individual or group file operations: Purge, Copy, Move, Rename, and several others. You can also select files through a number of other

PC MAGAZINE FACT FILE



KeepTrack Plus
The Finot Group
2390 El Camino Real, #3
Palo Alto, CA 94306
(800) 628-2828
List Price: $79
Requires: 256K RAM, two disk drives, DOS 2.0 or later.
In Short: A tree-driven program that sports a backup and restore capability. Not copy protected.

CIRCLE 659 ON READER SERVICE CARD

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CIRCLE 349 ON READER SERVICE CARD

methods, including a select mode (Ctrl-S) and a branch mode (Ctrl-B). However, care must be exercised in the branch mode. While you can easily move or rename an entire branch, you can just as easily wipe it off your disk.

BACK TO BACK The extra $40 for the backup facility is well worth it if you are lazy about making regular backups. Invoking the status screen display (F9) will indicate, among other things, the number of files that need to be backed up and the number of disks (in both PC and PC AT formats) needed to accomplish the job. And the file display window appends the word "backup" to each file that has been changed since the last backup.

■ *KeepTrack Plus* is an appealing program that offers comprehensive file management and disk backup at a reasonable cost.

One nice aspect of the backup utility is the exception handling. You have the capability to tag files or groups of files to be either backed up each time or not backed up. A number of other switches can be appended to the backup command to indicate such actions as verifying for disk erasures, splitting files, and turning backup attributes on or off.

KeepTrack Plus, which coexists amiably with other memory-resident programs, had absolutely no trouble in executing BASICA, .COM, or .EXE files. The program comes with both a user's guide and a guide to disk organization that delves into the theory and practice of good disk management. Though the user's guide is only average, it is most certainly sufficient when measured against the program's overall ease of use.

KeepTrack Plus is a good program that fulfills its functions very solidly. If you are more interested in file management and backup than in creating custom menus and shells, *KeepTrack Plus* is well worth an attentive look.—**Jon Pepper**

The Norton Commander

The Norton Commander is a spiffy DOS shell marketed by Peter Norton Computing, which also sells the popular *The Norton Utilities* and *The Norton Editor*. The program is easy to use, has some nice touches, and does a creditable job of disk and file management and menu control. However, the competition is tough among DOS shells, and *Commander* might have to navigate some rough seas if it hopes to duplicate the success of the other programs in the Norton series.

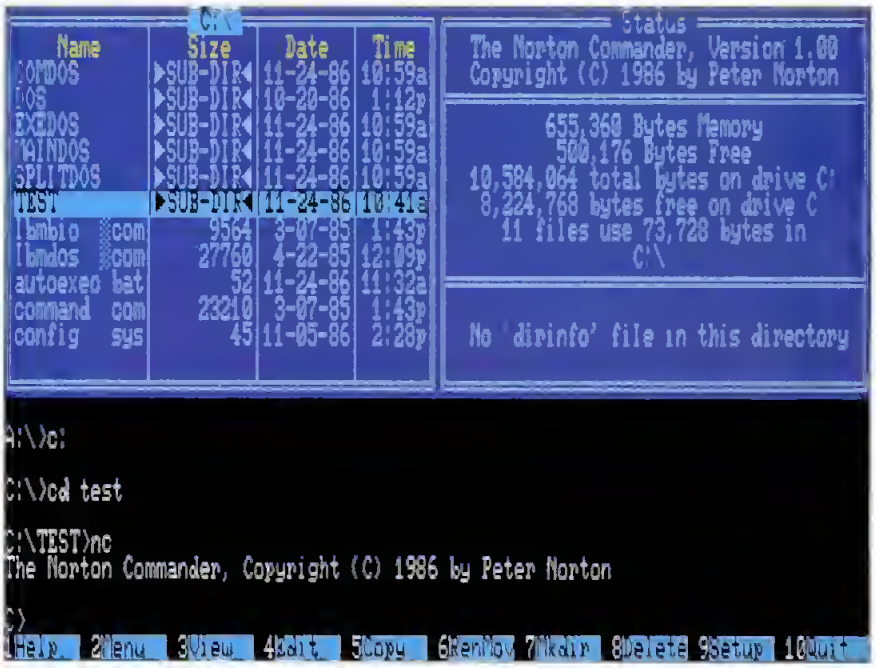
GOOD TUTORIAL *The Norton Commander* gets high marks for its manual, a slim, perfect-bound volume of 120 pages that is thorough and quite readable. The manual is divided into three sections: a quick start for experienced users, a tutorial that will walk you through key features, and a reference section that documents all of the program's features. A quick-reference card and a small keyboard-reference card are also packaged with *Commander*.

The memory-resident program is not copy protected and can be started in either of two modes. Typing NC loads the entire program into memory, while typing NCSMALL will swap out most of the pro-

PC MAGAZINE FACT FILE



The Norton Commander
Peter Norton Computing Inc.,
2210 Wilshire Blvd., #186
Santa Monica, CA 90403
(213) 453-2361
List Price: $75
Requires: 128K RAM, one disk drive, DOS 2.0 or later.
In Short: A shell that offers user-designed menus, point-and-shoot technology, and customization. Not copy protected.
CIRCLE 856 ON READER SERVICE CARD



This is the initial main street of The Norton Commander; *you can use the setup command to eliminate either or both of the windows or default to user-defined menus. If you don't know what your tree structure looks like,* The Norton Commander *won't help you.*

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QUICKcache works by loading the programs and files you use into your computer's memory and holding the information. When you exit and re-load a program, or when your application calls for a read from disk, QUICKcache immediately supplies the information from memory so your disk drives are not used at all! QUICKcache will astound you when it shows you just how many disk accesses and how much time you are saving. And because QUICKcache buffers more sectors each time you access your disk drives, *the more you use your computer, the faster it goes!*

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CIRCLE 220 ON READER SERVICE CARD

QUICKcache is extremely easy to load and use. All you do is set the amount of memory to use for the cache, and QUICKcache does the rest. It even keeps track of the information you use most often, so if the cache memory is filled, QUICKcache automatically replaces the least-used information with the new programs or files.

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- Disable disk caching easily for disk copies, etc.
- Pop-up Display of disk performance statistics
- Compatible with ALL applications—including memory-resident programs
- Works with regular or Above board memory
- Completely transparent to users
- Not copy protected
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Address:_____

City_____ State:_____ Zip:_____

Telephone:_____

Send to: MSD 214½ W. Main Street, St. Charles, IL 60174

Or call (312) 377-5151 with your credit card for immediate shipment.

gram, releasing more memory for applications programs.

Commander eschews the graphic tree approach of programs like *X-Tree* for a clean, businesslike look. The top of the screen shows two windows with file and/or status info, and the bottom of the screen lists the assignments for the ten function keys. A DOS prompt sits just above the function keys; you can access DOS directly, point and shoot at files which are listed, or use the function-key or Ctrl-key combinations. Mouse support is also provided, though the program functions quite well without one. Numerous file operations are well supported, and by using pop-up dialog boxes, many users will probably be able to work *Commander* without referring to the manual. The program also includes a *WordStar*-like editor and the ability to create custom user menus.

■ At $75, *The Norton Commander* is a reasonable buy and quite serviceable.

Menu creation involves creating an ASCII file with the menu option's description and the necessary DOS commands which will run it. You can make the options selectable by a specific character, a function key, or the first letter of the description. You can limit a menu to a specific directory. You can set up *The Norton Commander* so that it defaults to the two-window main screen, either of the two windows, a menu, or just the DOS prompt.

The multiple file operations are particularly well done: the gray Plus and Minus keys will select or de-select a group of files, and the Esc key will back out of the current operation.

Viewed alone, *The Norton Commander* is a nice product. Everything is done well and without much fuss. However, there are a few drawbacks, particularly when *Commander* is compared to other products. First, there is no direct method of backing up a hard disk, as there are with some other programs. And while *Commander* does what it does adeptly, it is caught between a rock and a hard place. It is more expensive and not as elegant a product as *X-Tree*, and it lacks the superior power and flexibility of a program like *1 DIR Plus*.

Still, at $75, *The Norton Commander* is a reasonable buy and a quite serviceable program. It simply isn't state of the art among DOS shells.—**Jon Pepper**

1 DIR Plus

Bourbaki's *1 DIR Plus* is a remarkably powerful and unique program that goes far beyond most other DOS shells. There are so many possibilities intrinsic to *1 DIR Plus* that it makes more sense to question what the program can't do than what it can. Potentially, *1 DIR Plus* can effectively serve the needs of novices, power users, and system integrators by providing multiple levels of customized menus, combined with its power and flexibility as a DOS shell.

QUICK START Despite its abundance of features, the only place that *1 DIR Plus* shows a lack of flexibility is during installation. A simple batch install procedure must be run for the program to function correctly. The install program will also automatically append *1 DIR Plus* to your AUTOEXEC.BAT file (or you can create one) if you wish.

Once the program boots, you are presented with enough information on-screen to keep a jet pilot jumping. The program defaults to its Quick Reference "face," one of eight possible faces it offers. The right side of the screen contains a column with time and data information, default and displayed disk drive data, and status indicators for Caps Lock, Num Lock, Pause, and Print. Along the bottom of the screen are eight boxes that contain the names of the other faces, which can be accessed by any one of three methods: point-and-shoot, using function keys F1 through F8, or Ctrl-key combinations (like Ctrl-T for the tree-mapped display). Although this might sound a bit confusing, it is indicative of how *1 DIR Plus* has been designed to accommodate both the preferences and experience levels of its users.



This is only one of the many "faces" of Bourbaki's 1 DIR Plus. *Other menu bars are accessed with the Crtl and Alt keys. Installing and customizing the program will take some time and effort, but once it is done you have an interface you helped to design.*

PC MAGAZINE FACT FILE



1 DIR Plus
Bourbaki Inc.
615 West Hays
Boise, ID 83702
(208) 342-5849
List Price: Introductory price to end users, $89; corporate users and others, $95.
Requires: 220K RAM, two disk drives, DOS 2.0 or later.
In Short: An extremely flexible program that is easily customized and allows you to generate menus and batch files. Not copy protected.

CIRCLE 658 ON READER SERVICE CARD

Some of *1 DIR Plus*'s other faces include an Informative Statistics face, which has a listing of extended memory used and free; a wide-display directory; a tree-structured directory (similar to *X-Tree*); and a Menu-Only face. Moving from face to face, or option to option, is simple and virtually instantaneous. If you get lost there are prompts at the bottom of the screen and context-sensitive help available at all times. You can also hit Ctrl-F4 to bring up a menu library that provides both a listing and direct access to all the menus contained in *1 DIR Plus*.

It almost goes without saying that *1 DIR Plus* will perform all the DOS functions you expect from a shell: global file operations, tagging, batch-file creation and execution, execution of BASICA, .COM, and .EXE files, and much more. Moreover, listing all of *1 DIR Plus*'s other attributes is a Herculean task. A small sampling of features includes autoscrolling, a screen-blanking feature, multiple levels of password security, and a built-in text editor. *1 DIR Plus* is memory-resident and seems to coexist nicely with other memory-resident programs, as long as it is the last one to be loaded.

WHO NEEDS IT? With its almost bewildering array of options, it is logical to wonder who can really benefit from the product. Surprisingly, the answer is almost anyone. New users can certainly utilize *1 DIR Plus* as a simple menu organizer and DOS shell, although they can get similar results for less money from a program like *X-Tree*. But for network managers, dealers, VARs, and power users, *1 DIR Plus* opens up a lot of possibilities. The program can be configured to provide an easy-to-use custom menu for turnkey systems, offer restricted access to files or applications in a corporate setting, and perform many other tasks.

1 DIR Plus is well documented, thoughtfully designed, and simply bursting with potential. Whether you need all that potential is your choice.
—Jon Pepper

Power-TOC

Although TOC Business Solutions' *Power-TOC* has a wealth of features—including usage tracking, password protection, and user-defined menus—its user interface hinders you from finding and using them easily. The problems range from insufficient on-screen help to too many diverse methods of accessing commands and features.

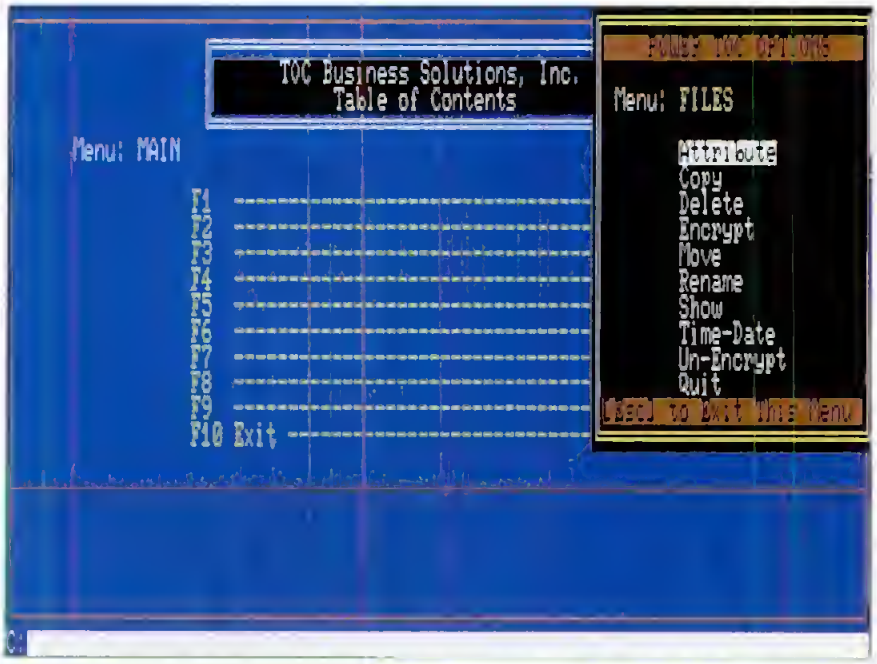
Power-TOC is one of those programs that make demands on your time and effort, at least initially. Because the interface uses a variety of command technologies and the screen does not provide any on-screen information for getting the novice user started, you will need to keep the manual on hand. Even if you do, though, you will find it less helpful than you would expect. Finding anything within the densely packed pages is about on a par with locating an erased file without using *The Norton Utilities*.

PC MAGAZINE FACT FILE



***Power-TOC*, Version 1.0**
TOC Business Solutions Inc.
P.O. Box 129
Old Westbury, NY 11568
(516) 795-2800
List Price: $79.95
Requires: 256K RAM, one disk drive, DOS 2.0 or later.
In Short: A DOS shell that provides usage tracking but suffers from poor on-screen help and a plethora of interface technologies. Not copy protected.

CIRCLE 663 ON READER SERVICE CARD

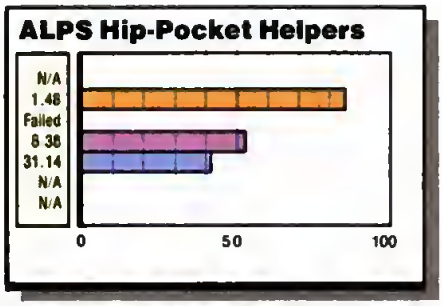


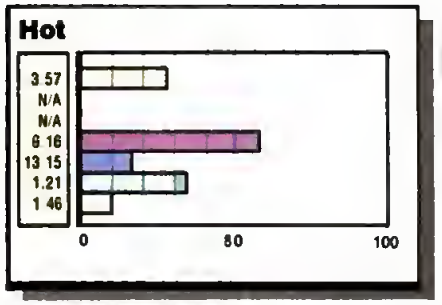
Power-TOC *is another program that could use an easier initial interface. While it supports a number of commands and pop-up menus, you have to memorize most of them.*

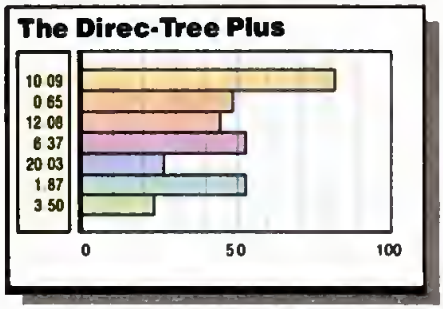
Performance Tests: DOS Shells

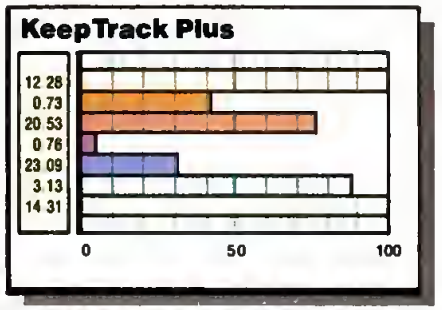
The DOS shell performance tests were conducted on a standard IBM PC-XT with 640K bytes of RAM, running under PC-DOS 3.1. In addition to DOS's two hidden system files and COMMAND.COM, the root directory had an AUTOEXEC.BAT file (which set the path to C:\ and C:\DOS) and a CONFIG.SYS file that set the files and buffers to 20 each. The other 480 user files (all of them PC-DOS files) were spread throughout 22 directories and took up 5,246,976 bytes (see Figure A). The directories were between one and three levels deep and had up to four branches within a subdirectory. Two directories were set aside for testing purposes. The first was used to install the program (where possible) and the second for the move operations. All of the tests were timed with a stopwatch from the moment the command began execution until control was returned to the user.

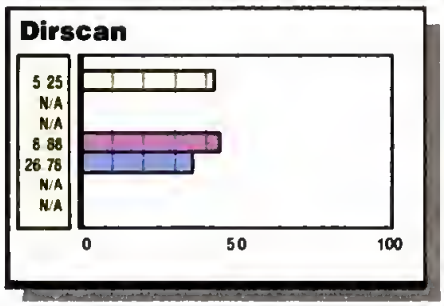


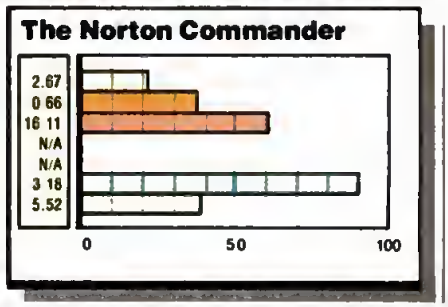


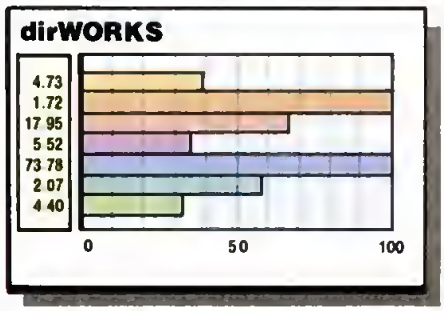


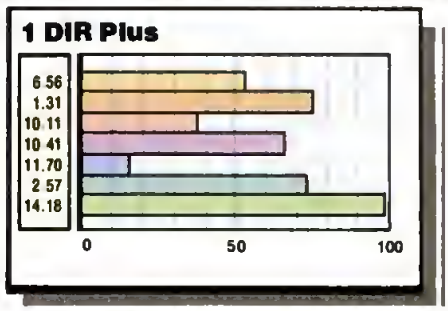


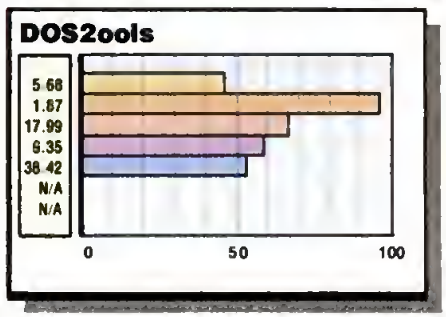


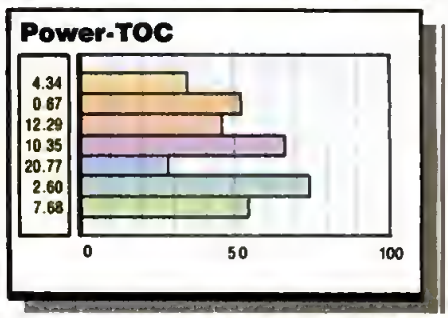


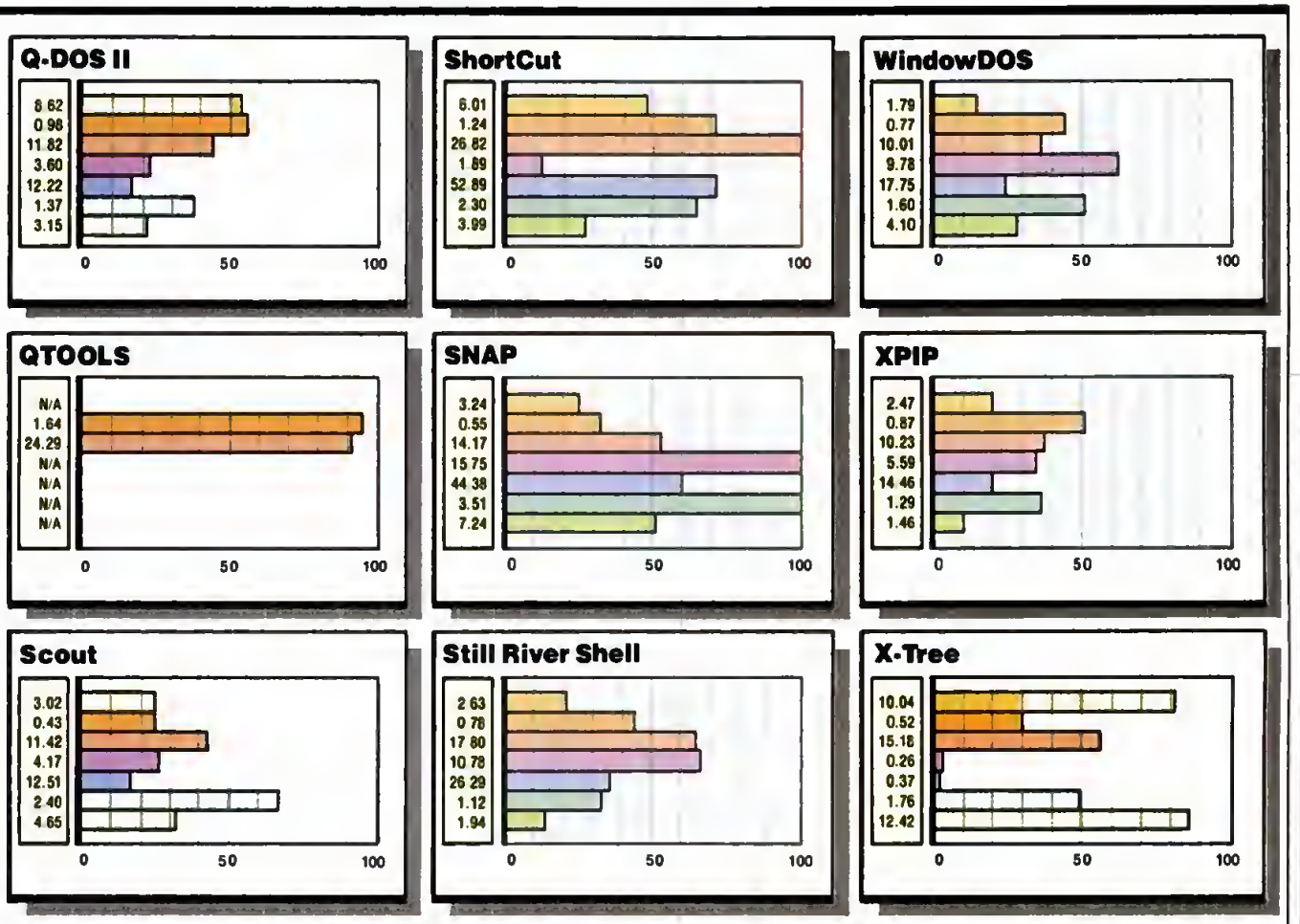












N/A — Not applicable (See caption for explanation)

The performance test times do not reflect the ease with which you can execute the command nor the number of input or confirmation screens you need to answer before the command is executed. The "Load from DOS prompt" test reflects the average time taken for the program to initially load from the DOS prompt. Note that in the case of memory-resident programs, the time does not account for the time needed for scanning the disk or creating a tree. Nor does it reflect the fact that after the initial load, memory-resident programs simply pop in, whereas some of the other programs, especially those that do not maintain logs of the drive's structure, need to reload or rescan. Because *QTOOLS* and *ALPS Hip-Pocket Helpers* are collections of standalone utilities without user-interface shells, a load-time test result would be inappropriate.

The Move operations included moving one file (COMMAND.COM from one of the subdirectories) and then 36 files (the main DOS disk files) into one of the test directories. Again, the time does not reflect the ease nor the difficulty of tagging the files. Two of the programs, *Dirscan* and *Hot*, do not have a Move command. Although the documentation in *ALPS Hip-Pocket Helpers* claims it is capable of mass-moving files, it is not; a spokesperson stated that the capability was not implemented.

The Find operations required finding one file (the AUTOEXEC.BAT file, which was previously moved to the test subdirectory) and all of the .COM files. In those cases in which the program stopped after the first find and prompted for confirmation, the appropriate key was hit to force the search to continue until the end. *QTOOLS* and *The Norton Commander* lack a findfile capability.

The final two tests required logging onto the A: drive and returning to the C: drive and displaying the contents. The floppy disk being logged onto was a copy of the main PC-DOS 3.1 disk with all of the files in the root directory. In the case of four programs — *ALPS Hip-Pocket Helpers*, *Dirscan*, *DOS2ools*, and *QTOOLS* — you would either be logged onto the working drive before using a command or simply direct the command to operate on the other drive.

Figure A: The structure and contents of the DOS shell performance test drive. In total, 480 user files were spread throughout the 22 directories and subdirectories shown here.

	contained COMMAND.COM, AUTOEXEC.BAT, CONFIG.SYS
TEST	empty, used for installing program
TEST2	empty, used for move operations
SPLITDOS	COMMAND.COM
BAS	all of the DOS .BAS files
COM	all of the DOS .COM files
EXE	all of the DOS .EXE files
OTHER	.PIF,.SYS, and.LST files
EXEDOS	all of the DOS .EXE files
COMDOS	all of the DOS .COM files
BAS	all of the DOS .BAS files
OTHER	.PIF,.SYS, and.LST files
COMDOS	all of the DOS .COM files
EXEDOS	all of the DOS .EXE files
BAS	all of the DOS .BAS files
OTHER	.PIF,.SYS, and.LST files
MAINDOS	files from main DOS disk
SUPDOS	files from supplementary DOS disk
DOS2	all of the DOS files
DOS21	all of the DOS files
DOS212	all of the DOS files
DOS3	all of the DOS files
DOS	all of the DOS files

Upon bootup, the first screen you encounter is the function-key menu, and initially only one key (F10 for Quit) is assigned. Nothing else. To access any of the features, you need to hit Alt-F10 or the Alt key in combination with another key. (However, you need to have read the manual to know that.) Assigning the remaining keys on the function-key menu involves entering a description, the appropriate commands and parameters, and any optional instructions. One nice feature is that the program semiautomates the path and command entries.

Besides accessing the function-key menu, you can pop up various utility menus by hitting Alt-F10. The main options menu consists of six submenus: Change, Directory, File, Misc, Edit, and Tracking. You access any of them and their submenu choices either by highlighting the option and hitting Return or by entering the first letter of the option. The file management features enable you to locate, move, and copy files. Other features include the ability to search for a string pattern, display system configuration information, set printer options, encrypt files, change a file's time and date fields, and view a visual tree. The tracking reports allow you to record usage by user, date, or specific directory path.

■ Although *Power-TOC* has a wealth of features, its user interface hinders you from finding them.

You can also access commands with "Speed commands" by using combinations of the Alt key with various keys, such as Alt-W for a wide directory listing and Alt-H for a listing of the available Speed keys. The tag facility is also one of the Speed commands. Why it is not within the File submenu, I cannot explain.

Power-TOC's built-in editor supports *WordStar*'s block commands and most of its cursor control sequences. Unfortunately, the editor does not support word wrap and reformatting. Also, while it can read *WordStar* files, it does not filter them. Consequently, using the editor to edit a *WordStar* document means editing with the high-bits set.

Power-TOC may deliver on all of its promises, but its command schemes are much too difficult to remember, and the lack of proper on-screen help makes learning and using the program even harder. There are more than enough excellent, easy-to-learn programs out there for you to pass this one by.—**Vincent Puglia**

Q-DOS II

Gazelle Systems' *Q-DOS II* offers a well-implemented and easy-to-learn program with a built-in editor and a DOS command line that you can carry highlighted filenames up to. Its use of a *1-2-3*–like menu bar and function keys make its commands readily accessible, and its overall performance will enhance your productivity.

Initially, you may find *Q-DOS II*'s main screen a mite busy. Besides the menu bar at the top, the screen displays the function-key commands, the files in the current directory, and statistics such as the number of files and tagged files. The functional visual tree is on another screen and only appears when you're executing appropriate commands such as changing directories and moving files.

Q-DOS II includes all of the necessary features you would expect in a utility program, from tagging to moving files. You tag files by either typing a wildcard specifi-

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Q-DOS The PROFESSIONAL Disk-Management Tool

***Q-DOS II*, Version 1.0**
Gazelle Systems
42 N. University Ave., #10
Provo, UT 84601
(800) 233-0383
(801) 377-1288
List Price: $44.95

Requires: 256K RAM, one disk drive, DOS 2.0 or later.

In Short: A clean, easy-to-use DOS shell that sports a *1-2-3*–like menu bar and a built-in editor. Not copy protected.

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Note Q-DOS II's *1-2-3–like command bar and function-key assignments. F6 provides an exit to the DOS command line, which allows you to perform operations you either cannot or prefer not to do from within the program.*

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cation or highlighting a specific file. In addition, you can reverse all of the tags. Unfortunately, you can only tag the files within the directory you are viewing, and exiting that directory removes all the tags. Thus, if you are attempting to move files spread across a number of directories, you need to repeat the same operation for each directory.

Rather than an execute command, *Q-DOS II* offers a DOS command line. Once you invoke the line, you can transfer highlighted files to the line by hitting the appropriate function key. In essence, this implementation allows you to include not only other files as parameters but also command switches, as in DOS's FORMAT /S. Upon returning to *Q-DOS II*, you are asked whether you wish to rescan the drive. If you do not, *Q-DOS II* does not reflect any changes you may have made while at the DOS prompt. Thus, you may have deleted a file and still have *Q-DOS II* show its existence.

■ *Q-DOS II*'s easily accessible commands make it extremely simple to work with.

The program also includes a status screen that displays date and time, the system's total and free RAM, the available drives, and the default file spec settings. You should note that if your system has over 640K bytes of RAM, the program has trouble listing the correct amount. The on-screen help, which is initially context-sensitive, can be used to search for any command or feature. However, since the help is simply the manual on disk, do not expect it to be any more or less helpful.

The built-in editor is extremely limited in that it does not support reformatting. On the other hand, it does permit you to write data to a buffer and then copy it elsewhere in the file, switch from hex to ASCII mode, and set and jump to markers. While it is not as powerful as a commercial word processor, it does enable you to create and edit files. And as such, it is more than suitable for writing batch files and short memos and editing files smaller than its limit of 61K bytes. If you find the editor does not meet your needs, you can install your own.

Q-DOS II may not be sardine-packed with features like some of the other programs in this article, but it should serve many people very well. Its easily accessible commands make it extremely simple to work with, and its overall performance is more than acceptable.—**Vincent Puglia**

QCAD Systems' *QTOOLS* is a collection of 19 UNIX and UNIX-like utilities for the MS-DOS world. Among other things, the collection contains utilities for listing and concatenating files, changing file attributes, manipulating text files, program debugging, and maintaining directory structures. You can access each of the individual programs at the DOS prompt and can pipe or redirect output from one program to another with a minimum of fuss.

While the idea of UNIX may be frightening to some people, the *QTOOLS* utilities are extremely easy to use. To learn them, you must simply commit their names to memory, since the names supply the correct syntax if you cannot remember it. If you need it, a help file is included. About the most difficult aspect of learning the programs is that you can use both the slash (/) and the backslash (\) for designating subdirectories, and the backslash can also be used to signal a literal. The latter can present some problems if the character following the backslash is an asterisk (*).

The move command (MV.COM) differs from other moves in that you can include more than one filename or filename pattern as the source. For example, you can issue the command MV *.TXT /WSTAR//*.BAK /DONE and have all of the .TXT files in the current directory and the .BAK files in the WSTAR directory transferred to the subdirectory DONE. Unfortunately, the program does not assume the destination of the target directory, as does *DOS2ools*'s MOVE.COM, so you cannot enter the command MV /WSTAR// *.BAK and expect the files to be brought to the default directory. Nor, for that matter, does the program warn you if the file being moved already exists in the target—it simply overwrites it.

Two of the more interesting DOS-like commands are DIFF and MORE. While there are any number of programs that compare files, *QTOOLS*'s DIFF command is one of the few that displays the files' contents as it compares them. The comparison is line by line, and you can set a line limit after which differing files must be resynchronized to be a match. *QTOOLS*'s MORE combines features of DOS's MORE and TYPE commands and enhances them by allowing you to include more than one file as input, jump *x* number of screens or files, go back *x* number of screens or files, and start displaying at a given line number.

The text manipulation utilities include FGREP and GREP. While both utilities search text files for patterns, the latter permits more complex searches. In both cases, the commands print the line and pattern for which you are searching. In the case of FGREP, the search pattern must be fixed. With GREP, the pattern may contain such metacharacters as wildcards, the beginning of a line, and character sets.

The 35-page manual is well organized, filled with concrete examples, and not overtechnical. Between it, the help command, and the individual programs' own help messages, you should have little or no trouble locating and using the utilities immediately.

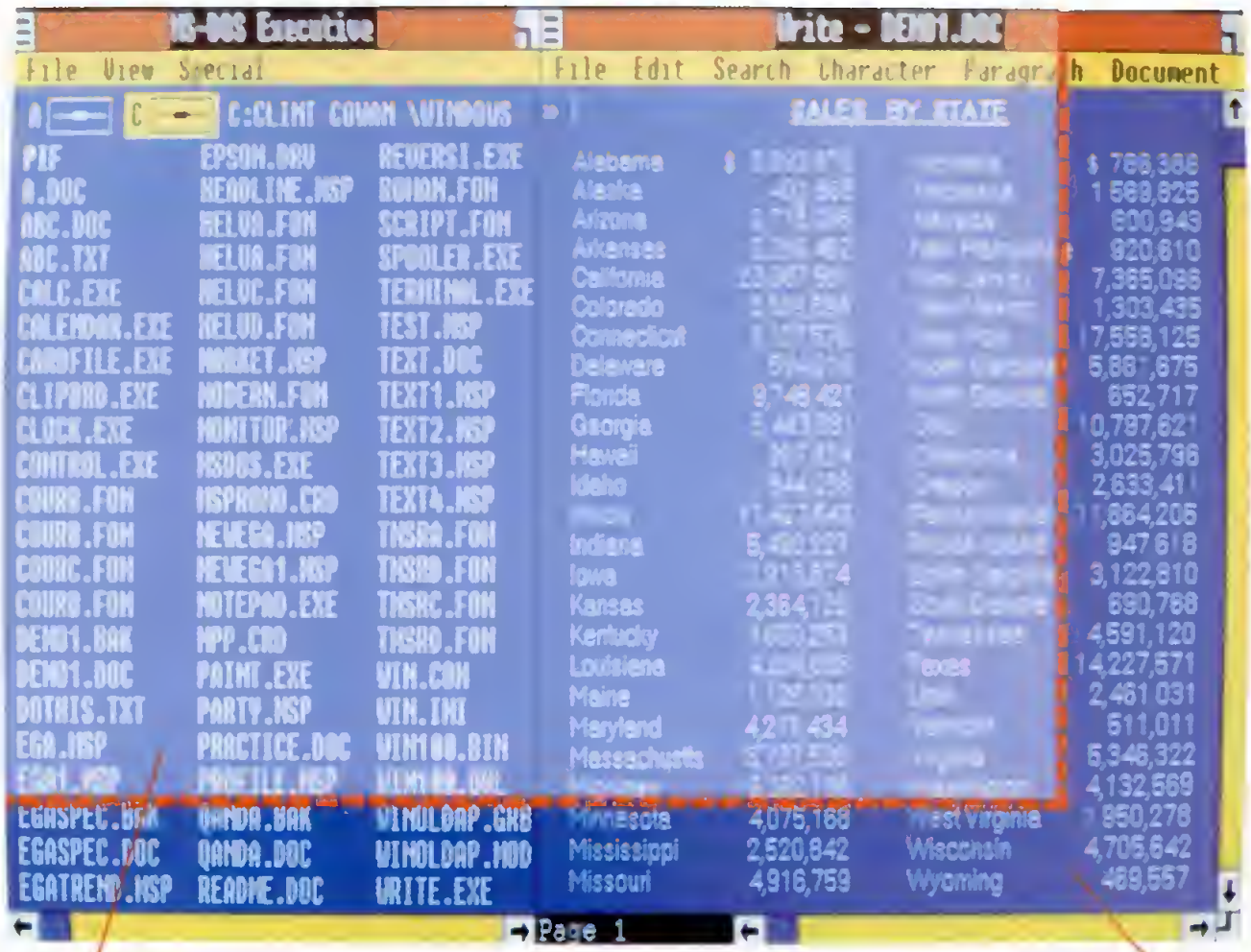
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***QTOOLS*, Version 1.0**
QCAD Systems Inc.
3333A Octavius Dr.
Santa Clara, CA 95054
(800) 538-9787
(408) 727-6671
List Price: $49.50
Requires: 256K RAM, one disk drive, DOS 2.0 or later.
In Short: A well-designed set of 19 UNIX-like utilities for the PC, including GREP, LS, and CAT. Not copy protected.

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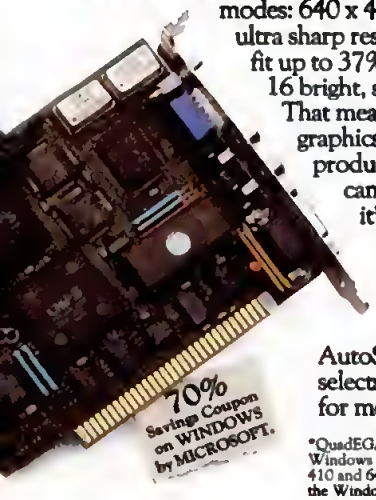


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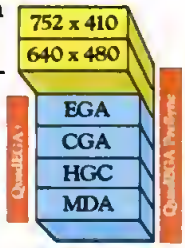


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If you do the majority of your computing with UNIX or a heavy C programmer, you are certain to find *QTOOLS* comfortable to work with. Even if you are not, the $49.50 price tag is not much of an investment for a collection of utilities, some of which you cannot find elsewhere.
—Vincent Puglia

Scout

John J. Newlin's *Scout* provides much of the information and many of the functions you need to use your disk drives effectively. At times, however, you will find yourself wishing it were less taciturn and a bit friendlier.

In addition to the standard DOS commands, *Scout* comes with the usual set of functions found in extended-DOS utility programs, such as the ability to tag and move files. *Scout* also allows you to set printer controls, move files, strip and copy *WordStar* files, save and print graphics screens, obtain system configuration, and determine drive specifications. Perhaps the most unusual feature is *Scout*'s ability to change a file's date and time. This can be very useful if you forget to set the date and time and then later need to manipulate or back up files based on their creation or modification dates. (It also helps you play office politics, proving you created a file before you actually did.)

Scout is a memory-resident program. John J. Newlin claims compatibility with as many as nine programs, including *dBASE*, *SideKick*, *1-2-3*, and *WordStar*. You can configure *Scout* to take up as much or as little memory as you want and free the memory it does occupy for that humongous worksheet. Even better, you can format disks from within an application with *Scout*'s own format program—which is at least twice as fast as DOS's FORMAT.COM because it doesn't verify. If you are constantly running out of formatted diskettes at the most inappropriate times, this feature alone may be worth the purchase price.

Scout not only allows you to execute a program, it also lets you add parameters to it. However, if you use the parameter option, you must input the parameter. If you don't, you'll cancel the command. Upon exiting the executed program, you are asked if you want to return to *Scout*. A negative response leaves you at the DOS prompt, at which point you can recall the program simply by entering the "hot key" combination.

Scout maps the terrain it will work in and maintains the paths in its own log so future access is always immediate. Unfortunately, the main screen displays only the contents of the current directory and such statistical information as the number and size of files in the directory. If you need to know more, you must issue a command, which brings you to one of *Scout*'s drawbacks—a poorly designed help interface. You access help by hitting Ctrl-H—simple enough, but the screen itself is so busy, finding anything is a chore. Also, because many of the various keystrokes are nonmnemonic, you will need to refer to the help screen often.

The program's second drawback is the lack of a functional visual tree. Because the program only displays the current directory, reconnoitering the drive's structure could become a lesson in disjointed



Note that Scout *requires you to hit Ctrl-H to call up help, which provides a list of the commands. Also note that the lack of a functional tree means you will be working with a fragmented concept of your disk structure.*

■ At times, you will find yourself wishing *Scout* were less taciturn and a bit friendlier.

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Scout
John J. Newlin
4060-228 Rosenda Ct.
San Diego, CA 92122
(619) 455-6225
List Price: $49.95
Requires: 128K RAM, two disk drives, DOS 2.1 or later (256K RAM requires DOS 3.0).
In Short: A memory-resident program with its own format command that suffers from a poorly designed command window. Not copy protected.

CIRCLE 672 ON READER SERVICE CARD

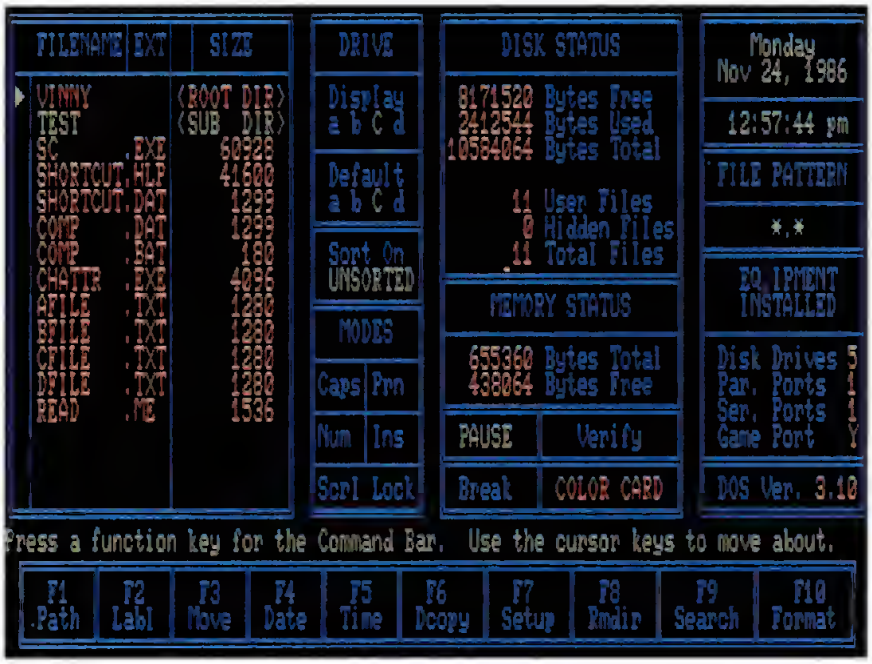
mapping. That is, you may know the contents of any given directory, but you will be hard-pressed to recognize the overall relationships.

Scout is an excellent little utility that deserves a better interface. If a *1-2-3*–like command bar is impossible, perhaps a pop-up command window à la *dirWORKS* (reviewed in this article) would do. As it currently stands, however, this utility which should extend your productivity actually makes new demands on your time.—**Vincent Puglia**

ShortCut

Mossy Rock Systems' *ShortCut* differs from most of the other programs in this article in two ways: it is memory resident, and it uses DOS commands rather than built-in ones whenever it can. You access commands through either function keys or Ctrl-key sequences, and you can create different configuration files and help screens for particular needs. On the whole, though, the program is not excessively friendly, nor does it offer enough power to make it stand out from the rest.

In some respects, *ShortCut* resembles Bourbaki's *1 DIR Plus*. For example, except for the lack of a command line, it divides the main screen in much the same way: the files are listed on the left, the statistics on the right, defaults in the middle, and a command bar on the bottom. Also like *1 DIR Plus*, the default command bar is only one of three; the others, which are accessible through the Alt and Ctrl keys, can be defined by the user. Unfortunately, because it lacks macro and batch creation facilities, it does not have the flexibility and power that *1 DIR Plus* does.



On the surface, ShortCut *resembles* 1 DIR Plus; *additional commands are available by hitting the Alt and Ctrl keys. Note the five disk drives listed for an IBM PC-XT (on the right).*

While *ShortCut* consolidates many DOS features into one easily accessible area, it does not really add to their functionality—at times, it even makes them more tedious. For example, the Type command requires you to mark the file before you can view it. Not only is the marking an additional step, but you also need to hit the Enter key after hitting the appropriate function key. This means that to view a file, you must highlight it, mark it, hit F2, and then hit Enter. And if your file is in *WordStar* format, you will have to read it with the high bits and without a pause. Even when the program extends DOS's utility, such as with a Move command, the implementation is less than exciting, since you need to tag it first. While the Move operation may not be intimidating, it is somewhat time-consuming when you are working on only one file.

Although *ShortCut* can be popped in while working with applications programs, it does not offer any unique features to warrant its memory residency. True, you can use DOS's FORMAT.COM, but that in itself does not really add enough, especially when you consider that many newer applications programs already let you exit to DOS specifically so that you can format new data disks.

Even the execution of a program from within *ShortCut* is less than optimal. The Run command, for example, is limited to .EXE and .BAS files only. If you want to highlight a data file and then pass it to the appropriate applications program, you need to define a command that will accept the file as a parameter and save the definition in one of the alternate command bar windows. Of course, you can also write a batch file that would perform the same operation.

■ *ShortCut* uses DOS commands rather than built-in ones whenever it can.

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***ShortCut*, Version 2.01**
Mossy Rock Systems
P.O. Box 420876
Sacramento, CA 95841
(916) 334-5542
List Price: $49.95
Requires: 92K RAM, one disk drive, DOS 2.0 or later.
In Short: A memory-resident program that uses DOS for many of its commands. Not copy protected.

CIRCLE 667 ON READER SERVICE CARD

ShortCut also includes a separate file that enables you to change a file's attributes. According to Mossy Rock Systems, it was not included as part of the main program because they wished to keep the program accessible to novices. Finally, the default editor is EDLIN, so you had best drag out your DOS manual and bone up on its commands.

ShortCut's manual is over a hundred pages long and filled with information. If you are looking for an easy program to learn, this is not it. Nor is *ShortCut* the program to get if you want a lot more power than DOS can deliver.—**Vincent Puglia**

SNAP

The Mt. Whitney Group's *SNAP* is a strong contender in the field, offering file management capability, encryption/decryption, a *WordStar*-like editor that supports both subdirectories and windows, and a menu-based interface. It is relatively easy to learn and use and powerful and flexible enough to satisfy most users.

SNAP presents you with a first-letter/point-and-shoot menu. You can add to the original menu simply by entering the option and following the prompts. Unfortunately, generating a new menu choice is intuitive only after you have created and tested your first. At that point, you realize the process is similar to that of creating a batch file, the only difference being that you don't have to enter a command for returning to the default directory or menu. During menu generation, you can copy items to the buffer and then insert them within another menu. This enables you to insert, for example, the system utilities option into each of your submenus.

Among its file maintenance facilities, SNAP provides a global delete feature, which is perhaps one of the handiest commands in the program, since it will allow you to specify a file mask and then have the program search across the entire disk, deleting the designated files as it goes. An optional confirmation is permitted.

Other commands allow you to tag, copy, and move files. If you attempt to move a file into a directory that already contains a file of the same name, SNAP won't perform the transfer. A side effect of this is that if you attempt to move a number of files into a directory that does not exist, the program assumes you are renaming the files and stops after it operates on the first file. Executing a file in SNAP involves going into the file's subdirectory, highlighting it, and hitting the X key. You are prompted for parameters.



Primarily menu-driven, SNAP *allows you to highlight or type the first letter of the command. If you ore looking for o progrom with o good editor ond menu-generation capability,* SNAP *has them.*

Another of the system utilities choices, About Your Computer, supplies such configuration information as the number and type of disk drives and ports, the presence of an 8087 math coprocessor, and the environment. SNAP also provides menu choices for learning DOS commands (including DOS 3.2), searching for files, and viewing a visual tree. While you cannot use the visual tree for navigation, it can be seen with or without file names.

WordStor aficionados will both love and hate the Sedit editor. Not only does it support virtually all of the familiar Ctrl-character commands, but it also comes with an undo feature. Best of all, though, Sedit comes up regardless of the directory you or the document file are in, and it allows you to open windows. As powerful as it is, however, it does differ enough from MicroPro's *WordStar* to cause some discomfort occasionally. For example, the reformat command undoes tabs and leaves you at the top of the paragraph rather than the bottom. Also, canceling commands is difficult, perhaps because the program uses the Esc key for commands.

If you are in the market for a menu-driven program that provides and enhances DOS commands, you should definitely

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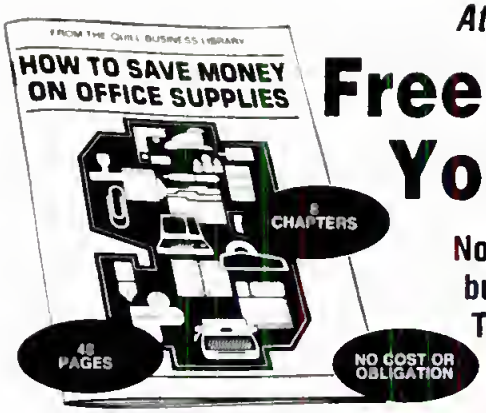
SNAP

***SNAP*, Version 1.0**
The Mt. Whitney Group
11612 Knott Ave.,
#G-19
Garden Grove, CA
92641
(800) 992-4992
(800) 624-7355 (in Calif.)

List Price: $99.95
Requires: 256K RAM, hard disk, DOS 2.1 or later.
In Short: A strong menu-driven program that enhances DOS's utilities with a *WordStar*-like editor; one very nice feature is a global delete. Not copy protected.

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look into SNAP. It may not be as easy to use as the name implies, but it's not much harder. If you have any problems, the various context-sensitive help screens and the 76-page manual with index should be able to alleviate them.—**Vincent Puglia**

Still River Shell

Bob Howard's *Still River Shell*, Version 1.33, is unique among the other programs reviewed here in that it is shareware; that is, you pay only if you find the program useful. In all likelihood, you will send the contribution because the program does deliver. In addition to the standard DOS services, *Still River Shell* allows you to assign batch files to keystrokes, access previously executed DOS commands, and use a tree for navigating through the disk structure.

The main screen is divided into three sections: file and directory listings on the left, file and directory statistics on the right, and a *1-2-3*–like command bar along the bottom. You access a command by typing or highlighting its first letter and then entering it. At that point, you either input the parameters or select a file or directory name by highlighting it and hitting the Ins key—the name is automatically entered onto the command line. You can then edit the command line to add any switches you wish. The program prompts for confirmation when appropriate.

One of the program's nicer features is its ability to recall any of the previously executed DOS commands. Essentially, *Still River Shell* maintains up to 20 of the commands in a buffer and allows you to insert the command you want onto the command line. You access the commands by selecting the Xdos option on the main menu, scrolling through the commands with the cursor keys, and then executing the desired command.

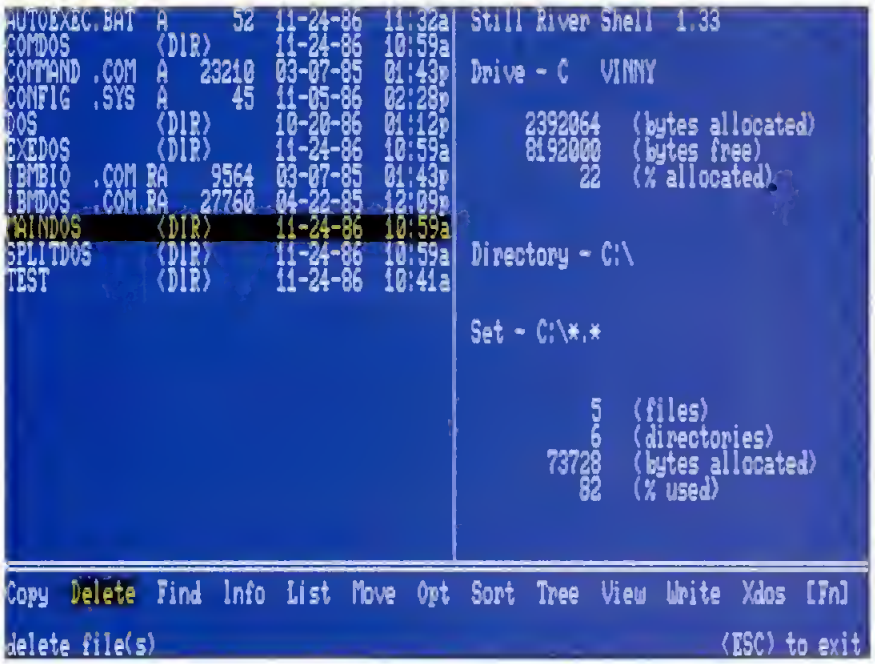
Another equally useful feature is the ability to assign batch files with wildcard parameters to the function keys. When combined with the Alt and Ctrl keys, you can assign up to 30 files. The files extend *Still River Shell*'s normal commands by allowing you to issue regularly used commands with a minimum of keystrokes.

Other features include the ability to copy entire directories onto a floppy disk without having the system crash because of insufficient space, moving and finding files, writing a set of files selected with the find or list command to disk, and using the Tree command to traverse the subdirectories.

Although all of the program's features operate without any problems, there are times you wish *Still River Shell* offered more. Some of these instances are trivial. For example, when you use the Find command to locate and delete a set of files, the shell does not automatically return you to the last directory you were in. You need to list it first. Of more concern, though, is the absence of a tag capability. While you can write a file set to disk and then use it to manipulate the files, it is not as elegant as tagging the files and then working with them.

Still River Shell may not offer all of the features I like to see in a DOS shell, but the features it does offer are powerful enough to warrant your attention.

—**Vincent Puglia**



Bob Howard's Still River Shell *may not look like much, but it does offer a simple and somewhat elegant interface to your file management needs. The XDOS feature recalls previous DOS commands.*

■ In all likelihood, you will send the *Still River Shell* shareware contribution because the program does deliver.

PC MAGAZINE FACT FILE



Still River Shell,
Version 1.33
Bob Howard
P.O. Box 57
Still River, MA 01467
(617) 456-3699
List Price: $35
Requires: 76K RAM, one disk drive, DOS 2.0 or later.
In Short: A user-supported program that allows you to access up to 20 previously executed DOS commands and assign up to 30 batch files to the function keys. Not copy protected.

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"Developed by RIX Softworks"

CIRCLE 117 ON READER SERVICE CARD

WindowDOS

WindowDOS, from WindowDOS Associates, is a fundamentally different product from most of the DOS shells we tested. In their simplest form, most of the other programs we examined create a shell and/or menu around DOS that facilitates disk management and organization and allows the execution of applications programs. *WindowDOS* is an interactive DOS utility that allows pop-up access to DOS commands from within an applications program. Depending on your needs, this could be a more attractive paradigm. However, *WindowDOS* is not really a shell program, and users desiring a shell facility will need to look for a different program that could be used in conjunction with *WindowDOS*.

WindowDOS, Version 2.0, comes on a single, non-copy-protected disk and requires no special installation. The program can run in either an interactive mode or a foreground, execute-only mode; however, the program does not require much overhead (less than 50K bytes) and obviously offers much more utility in the memory-resident mode.

Once loaded, Ctrl-Ins will pop *WindowDOS* on top of virtually any screen or application that is currently running. A five-column display will show up to 85 files at a time from the logged drive. If more than 85 files are on the disk, you can page through the display to show additional files. Moving the cursor from file to file will change the detail display at the top of the window, which includes the filename, creation date and time, and size. The bottom of the screen lists a number of commands that you can access by typing their first letter: Copy, Dir, Erase, Format, Global, List, MkDir, Rename, Sort, Tree, and View. You can enter other commands via Ctrl-key combinations or by using the F1 through F10 keys.

A CURIOUS MIX *WindowDOS* is a bit of a curious mix. In many respects, it does a fair job of disk and file management. It can rename or erase subdirectories; execute a global find, copy, or purge of marked files; sort files by name, extension, date, or size; switch directories easily; move files; password-lock the system;



WindowDOS, *one of the few pop-up memory-resident DOS shells, uses a simple command-bar interface along with point-and-shoot technology. Many will find the environment option, which displays memory information such as the loading address of resident programs, and the proprietary format program extremely helpful.*

and generally perform the same DOS functions as other DOS shells.

However, *WindowDOS* also has a few unusual features that are interesting, although not everyone will need them or like them. For example, Ctrl-E will pop up an Environment function that displays RAM usage, computer type, DOS version number, ROM date, and the memory load and interrupt vectors used by each program. This feature is potentially quite useful if you have a lot of RAM-resident programs and are trying to look for conflicts at certain memory locations. There is a backup feature that prevents files from being written to disks with insufficient space, a function that lists files to the screen in hex format, and a printer utility that will send control codes and characters to the default printer. *WindowDOS* also has the ability to format either high- or low-density floppy disks while other programs are running, which can prove useful.

There are a few limitations to *WindowDOS*. First, it has a limit of 255 files that can be displayed in total. If you have more than 255 files on the logged disk, the program won't show them at all. Second, there are a few amenities missing that show up in many other shell programs. There is no menu creation facility, and no ability to create user-defined macros. There are, however, a number of built-in macros for certain functions that can be accessed with two-keystroke commands.

Whether *WindowDOS* is for you depends on a number of factors. As a DOS

PC MAGAZINE FACT FILE



WindowDOS
WindowDOS Associates
P.O. Box 300488
Arlington, TX 76010
(817) 467-4103
List Price: $49.95
Requires: 96K RAM, one disk drive DOS 2.0 or later.
In Short: A memory-resident program that comes with its own Format command and a Display Environment command, which shows how your memory is being used. Not copy protected.

CIRCLE 657 ON READER SERVICE CARD

shell, *WindowDOS* has little or no appeal when compared to any number of other programs, since it simply isn't a shell program. However, if you simply want the ability to pop up DOS commands easily, *WindowDOS* can handle the task. Power users will probably want more features, but *WindowDOS* does offer a nice little collection of DOS utilities and programmer's aids in a pop-up program. Whether that is worth the price of admission is up to you.—**Jon Pepper**

XPIP

XPIP, from System Facilities, is one of those programs that offer commands on pop-up menus but still leave you at the DOS prompt so that you can enter commands as you wish. While this solution gives you maximum flexibility, it does little for the novice who still needs to learn all of the new commands.

When you first boot *XPIP*, it displays either a user-defined menu or a right brace (}) prompt, instead of DOS's greater-than (>) prompt. The menu is function key driven and can be used to access *XPIP*'s internal commands or your own applications programs. Alternatively, you can execute DOS commands and those of other programs just as if you didn't have *XPIP* at the command line. You can also display, edit, and reexecute not only the last command line you entered but also any of the last ten as well as up to ten stored commands. Finally, pressing the left or right arrow cursor key brings up *XPIP*'s command menus for file, directory, disk, and miscellaneous operations.

While most of *XPIP* uses the point-and-shoot menus and is easy to learn and use, its implementation for selection and exiting from menus is less than ideal. Rather than use the Return key for selection, *XPIP* uses the Ins key. While this is only a minor annoyance, it gains momentum when you couple it with *XPIP*'s use of Ctrl-C to return to the main screen. To many users, Ctrl-C means abort, break out (sometimes destructively), or cancel the operation in progress.

File operations include the ability to manipulate attributes, tag and move files, and destroy files. The last feature overwrites each byte in the designated file with an end-of-file character before deleting it, so that unerasing the file becomes a lesson in futility. The edit option presents you with a hex dump of the file's contents. While you can edit in ASCII, it is, at best, difficult. The string search feature displays the sought-for line immediately but does not pause automatically.

The miscellaneous operations menu allows you to access the stored commands and execute a command file. (*XPIP* command files can be used to automate repetitive operations such as backups.) This menu also provides an ASCII table and allows such operations as performing simple arithmetic and displaying the results in any base you designate.

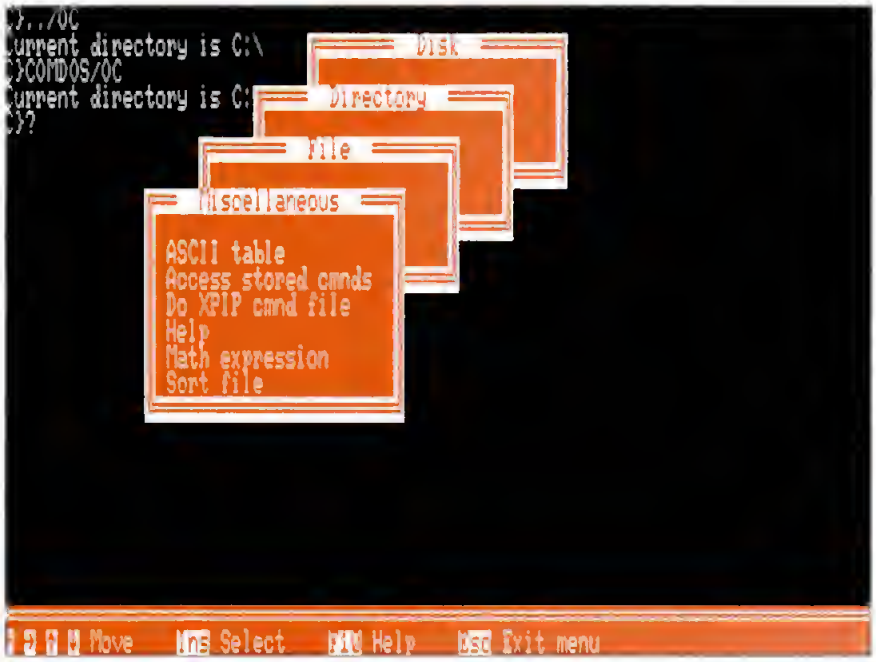
If it weren't for the Ctrl-C implementation, I would recommend *XPIP* to any power user who needed the power and flexibility of stored commands and command files. The recommendation would be less conditional if *XPIP* used something other than Ctrl-C (perhaps Esc) to back up a screen.—**Vincent Puglia**

PC MAGAZINE FACT FILE



***XPIP*, Version 5.01**
System Facilities Inc.
P.O. Box 7079
Charlottesville, VA
22906
(804) 977-5245
List Price: $29.95, plus $3 shipping and handling.
Requires: DOS 2.0.
In Short: An extremely powerful and flexible DOS shell that suffers from a disturbing usage of Ctrl-C. Not copy protected.

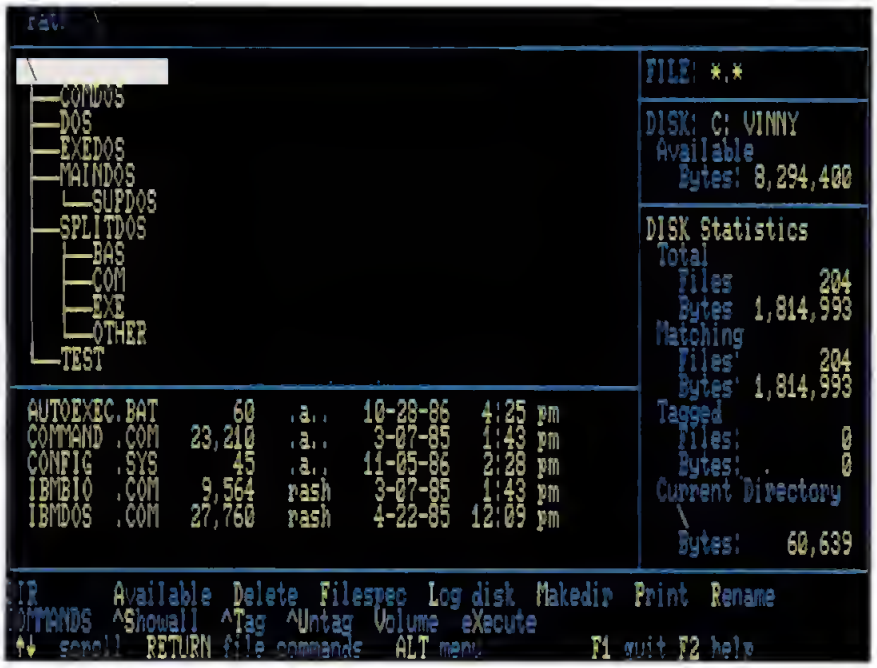
CIRCLE 668 ON READER SERVICE CARD



The initial XPIP *screen consists of a user-defined menu; these menus are accessed by hitting Alt-F10—something the screen neglects to tell you. Note the menu access to stored DOS commands and programmer's tools.*

X-Tree

X-Tree, from Executive Systems, is a superb alternative to DOS that is striking in its elegantly simple design, effective implementation, and ease of use. The program clearly proves that the best products don't have to be the most comprehensive or full-featured. While there are shells that can do more than *X-Tree*, there are few



X-Tree's interface is still the cleanest and easiest to use. The two left windows supply you with your tree and files, and the command area offers easy access to features.

that can match it for flexibility and easy file and hard disk management.

X-Tree, which requires 192K bytes of RAM to boot, is usually installed with little help from the manual. You can simply copy files onto your hard disk and type XTREE, and you're in business.

It took 9 seconds for *X-Tree* to boot on my 30-megabyte drive, which had almost 1,500 files on it. After a logo screen, *X-Tree* divides the screen into a number of windows. The most informative is the main window, which shows a tree-structure representation of all directories, with subdirectories attached to their main directories. Below this window is a display of files in the highlighted directory.

Toggling between these two windows is a simple matter of using the Enter key, and either window can be scrolled to show additional files. To the right are small windows that list disk and directory statistics: bytes, files, available space, and so on. Below the windows is a list of file commands, as well as prompts for F1 (quit), F2 (help), and F3 (cancel).

Unlike some shell programs that force you to learn another command set, *X-Tree* presents all of the options for you. There is also a menu of Alt commands that will display when that key is depressed.

While *X-Tree* can't do everything, it can make easy work of the more important DOS commands: DIR, DEL, COPY, TYPE, REN, MKDIR, RMDIR, CHDIR, and VOL are instantly accessible. *X-Tree* will also permit tagging files (for batch operations), printing files or the tree structure, and sorting files by a number of criteria, including date.

PC MAGAZINE FACT FILE



X-Tree
Executive Systems Inc.
15300 Ventura Blvd., #305
Sherman Oaks, CA 91403
(800) 634-5545
(800) 551-5353 (in Calif.)
List Price: $49.95
Requires: 192K RAM, one disk drive, DOS 2.1 or later.
In Short: An elegant program that offers flexibility and power: if it isn't the standard, it should be. Not copy protected.

CIRCLE 661 ON READER SERVICE CARD

PC MAGAZINE EDITOR'S CHOICE

In general, the quality of the programs is better than it was last year. Not only are they faster and more flexible, but their interfaces are more intuitive. Of the programs reviewed, three excelled enough to be awarded Editor's Choices.

Once again, Executive Systems' ***X-Tree*** *and E-X-E Software Systems'* ***DOS2ools*** *tower over their direct competition. X-Tree's functional visual tree, readily accessible commands, and flexibility will assure its home on many a hard disk. If you hate the idea of shells and prefer the DOS prompt, DOS2ools is still the best collection of standalone programs available, offering the most intelligent utilities on this side of artificial intelligence. A newcomer, Keep It Simple Software's* ***dirWORKS*** *lives up to its vendor's name while providing power and flexibility.*

BASICA, .COM, and .EXE files can all be run, but there may be some problems accessing files in paths. For example, I had *X-Tree* in my root directory and wanted to start *WordPerfect* and bring up a text file at the same time. While *WordPerfect* loaded without problem (from the directory c:\word), *X-Tree* couldn't locate the file c:\word\sample.txt at the same time.

There are also some capacity limitations. *X-Tree* can manage no more than 2,500 files and 180 directories on a disk. And you need to take care when using the program, as you could wipe out a ton of files with some careless keystrokes.

Otherwise, *X-Tree* is a gem. It's fast, smooth, and easy to learn, and showed no compatibility problems with memory-resident programs like *SideKick*. The manual is both concise and informative, and at less than $50, this program will help clear up an awful lot of hard disk confusion. *X-Tree* is a class product.—**Jon Pepper** PC

Jon Pepper and Vincent Puglia are frequent contributors to PC Magazine.

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THE IN-BETWEEN MACHINES

80286-BASED XT COMPATIBLES

With the great leap in features and capabilities taken by the second-generation AT past the first-generation XT, computer manufacturers are filling the gap with in-between products. The four 80286-based XTs reviewed here are worth considering for middle-of-the-road computer needs.

Generation gaps are inevitably difficult to span, and the chasm looming between the first-generation XT and second-generation AT is among the most formidable. The performance difference between the two computers is just shy of fantastic—about a factor of five. The software incompatibilities are subtle yet deadly; the hardware variations, troubling; and pricing policies, perplexing. Yet the great size of this generation gorge has lured many of the largest personal computer manufacturers to try to conquer it by creating a new product area in the wilderness of the in-between.

The allure is the market niche. Both the top and bottom ends of the computer market—the latest-generation, high-performance ATs on one side and first-generation, bargain-basement PCs on the other—are crowded, and the competition is fierce. The gap in between is vast enough that innumerable companies should be able to stake out their own claims, develop their own markets, and reap the rewards.

The result of this subdivide-and-conquer strategy has been an outpouring of in-between computers, machines with more power than the traditional PC or XT, yet without aspirations of rivaling the AT in all of its capabilities. Among these niche-players, the most intriguing are the 80286-based XT-compatible computers.

Three characteristics define this product class—the microprocessor, a hard disk, and size. By definition, all are based on the 16-bit Intel-designed 80286 microprocessor that's used in the IBM AT.

All the systems investigated here take additional advantage of the full capabilities of the 80286 chip by using a 16-bit data path for their system board memory. In addition, all of these systems complement the high-speed performance of that microprocessor with a hard disk, just as the original XT improved on the PC.

In many cases, size alone distinguishes these machines from full AT compatibles. Size is an issue because tall AT-style expansion cards won't fit into their shorter cases, making them incompatible with many AT expansion cards.

Beyond those three product-defining similarities, however, no single description or philosophy fits them all, though all are meant as grout for the much-discussed PC generation gap.

WHY AND WHEREFORE Perhaps the best way to get to know this unique breed of desktop computer is to examine it from the manufacturers' perspectives, in light of the competition at the time each machine was announced.

ITT launched this class of computer in late 1984 with the introduction of the ITT XTRA XP. As the first of the 80286-based XTs, part of its intrinsic design was to overcome the teething pains associated with IBM's introduction of the AT—the AT's subtle incompatibilities with previous PCs. Slight differences between the 80286 and 8088 command sets made some programs crash when confronted with the AT. With clever circuit designs, ITT eliminated those problems in the XTRA XP.

Its glory was short-lived, however. Because the AT was unexpectedly (and wildly) successful, no software maker could afford to miss the burgeoning AT market. Almost overnight, AT-incompatible software was rewritten to make it doubly compatible, with both the XT and AT standards, and the XTRA's extra compatibility lost its significance.

The AT&T 6300 Plus appears to be a catch-up computer. The original 6300 was introduced as an alternative to IBM's XT with the added benefit of a faster microprocessor, the full 16-bit 8086. With the passing years and introduction of the IBM AT, however, the ordinary 6300 lost is high-performance image and fell to the back of the pack.

TO HAVE AND HAVE LESS

The next version of DOS, which Microsoft calls 286 DOS internally, will change a few things. First and foremost, it will be a multitasking operating system. Since it won't operate on 8088-based machines, it's the first instance of non–backward compatibility in the personal computer industry.

Software designers will be the recipients of most of the benefits of multitasking. For the first time, however, they will be unable to give users of PCs the same functionality that they can get on ATs. Speed will no longer be the sole deciding factor.

For whatever else may be wrong with ATs masquerading as XTs, they prove that the 80286 is the new lowest-common-denominator chip. Not that 6 million 8088-based machines will go to the scrap heap, but 8088 users will have to be satisfied with less than their more-modern fellows. As protected-mode software gets better and better, the PCs will be pushed down to less-significant roles. It's unlikely that today's crop of accelerator cards will be able to run 286 DOS, and it's unclear whether accelerator cards capable of running 286 DOS will be cost effective.—**Bill Machrone**

The AT&T 6300 Plus, introduced in October 1985, gave AT&T an 80286-based machine that sacrifices little compatibility with the previous AT&T PC. Not only does the 6300 Plus bring AT&T out of the Dark Ages, it finally gives the company a reasonably priced, adequately performing engine to run the company's infamous UNIX operating system. However, in maintaining 6300 compatibility, the 6300 Plus missed the bus for AT compatibility.

The ALR PC2E/10 MHz might rate as an IBM PC-XT Model 286 clone, except that the early 1986 announcement of the base version of the machine, ALR's PC2/286, predated IBM's improved XT by many months. Moreover, the PC2E/10 MHz is so different from (and in many ways better than) the new XT that it can hardly be considered a mere compatible. It's more an AT in XT's clothing. Its market fit is as a high-performance reduced-footprint AT with limited expandability.

The IBM PC-XT Model 286 is an enigmatic machine. Probably the best excuse for its existence is a face-saving method for IBM to market a lower-priced AT to meet its growing competition while at the same time not cheapening its flagship personal computer. Although the IBM name no longer guarantees ultimate success (want to buy a Portable PC or PC*jr*—cheap?), the XT Model 286 has future potential because of its high degree of AT compatibility.

Because each of these computers seems to have a different design goal, they lack a common appeal. There are different reasons for buying any one of the foursome—if there is a reason at all.

Yet all 80286-based XTs share a common problem. They do not appeal to either end of the spectrum of PC buyers—the frugal users who want an inexpensive engine to handle their calculations and daily chores or the power users who want the fastest-possible computer to snap back with instant answers. The 80286-based XTs are not cheap, and they do not offer the ultimate in performance.

WHY BUY? Worse, the prices of most of these 80286-based XTs overlap with those of the least-expensive AT compatibles. For most people, forgoing true and complete AT compatibility to buy one of these computers just doesn't make sense.

Perhaps you have the most compelling reason to buy one of these machines when you are confronted by the realities of the one-brand shop, volume-purchase agreement, or some other allegiance to one brand. For instance, the AT&T 6300 Plus is the only way to get a high-performance, DOS-compatible personal computer within the AT&T product line. Similarly, the IBM PC-XT Model 286 will save you several hundred dollars if you want AT-like performance and must buy IBM.

If you lack that motivation, justifying the purchase of an 80286-based XT is

more difficult. All suffer from an inherent incompatibility.

Although writing BIOS software has evolved from art to craft, and nearly every new PC-compatible computer can reasonably be expected to run most PC software, by definition these XT compatibles suffer from a physical incompatibility with many AT-oriented goodies. Tall, AT-style expansion cards will not fit into the cramped internal quarters of an XT compatible. Even more forbidding are the machines that have a proprietary 16-bit expansion bus structure. Even short AT-style 16-bit cards will not work in them.

With the introduction of the IBM PC-XT Model 286, however, the first reason should disappear as soon as circuit board engineers have a few moments to spend in front of the CAD machines to redesign their products to fit on smaller cards. If, however, your company has a bountiful supply of previously purchased AT-style expansion cards, you might not want your new hardware to be incompatible with them.

The other problem is more difficult to get around. Buy a computer with a proprietary expansion bus and you may be stuck with half-speed I/O access or a long-term affair with the maker of the computer for high-speed peripherals. You have to pray that the anointed manufacturer decides to stay in the PC business.

Unavoidably, making the decision to buy one of these middle-ground computers requires you to match features and prices to your own particular needs. To help you make the right mating, here's a look at four popular 80286-based XT alternatives.

ALR PC2E/10 MHz

The squared-off styling, the small control panel, and the single right-hand disk drive bay make the ALR PC2E/10 MHz from Advanced Logic Research look like the offspring of a contented couple of IBM ATs. Although exactly the same size as an XT, the PC2E/10 MHz looks like a miniature AT. Even the keylock, power-on, and disk-activity indicators in the upper left of the front panel match the IBM style. Its updated, AT-like appearance makes the original PC and XT Model 286 look like the products of the tail-fin age.

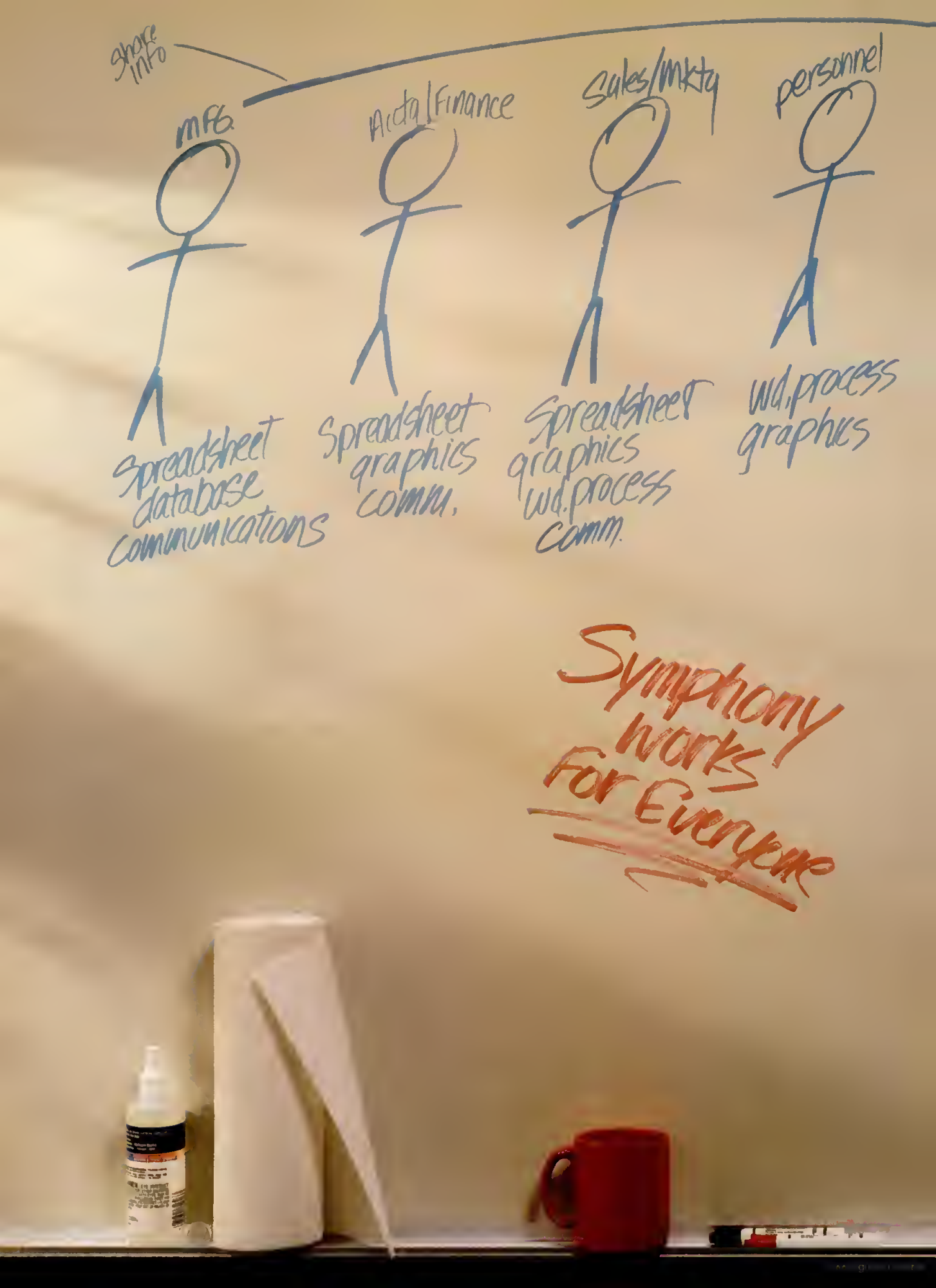
Despite its reduced size, the PC2E/10 MHz is a big performer. Its 80286 microprocessor runs at either 10 or 8 MHz. You can select the speed by using a toggle switch on the rear of the system board that protrudes from the back of the machine. Running at top speed, the PC2E/10 MHz will outperform IBM's best by 20 to 30 percent. For those power users who need even more speed, a socket is provided for an 80287 numeric coprocessor.

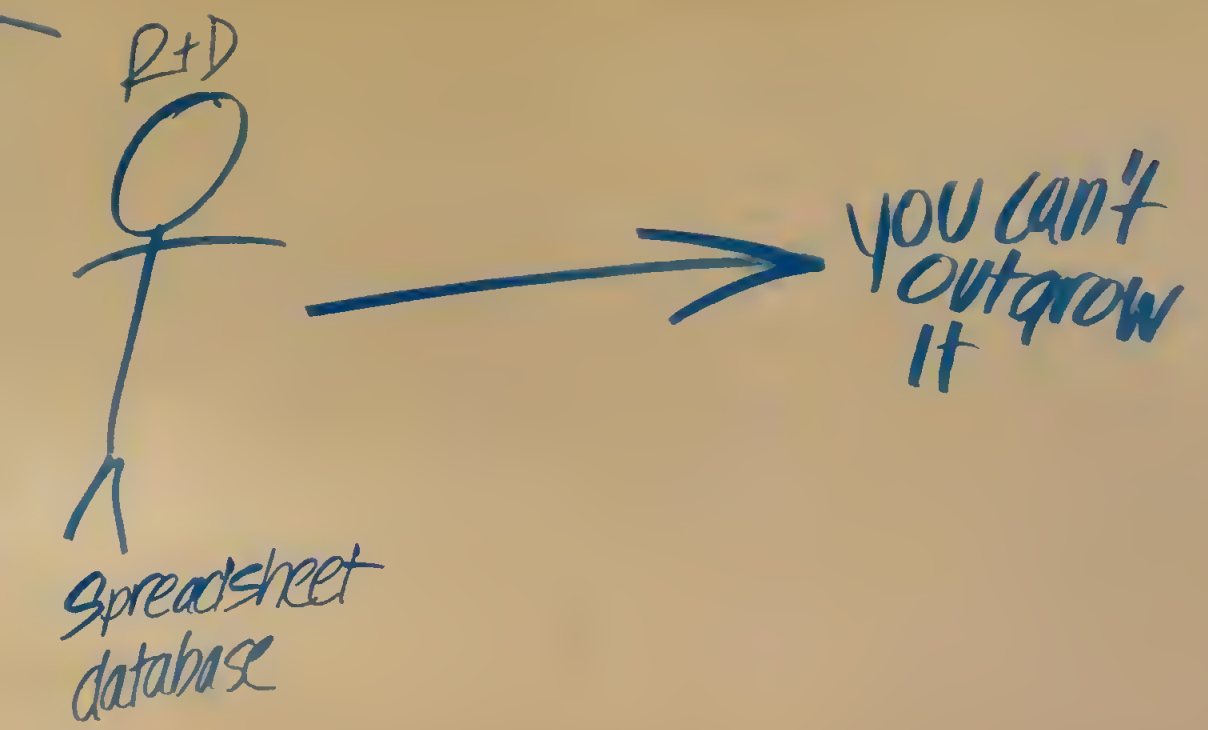
Its beauty runs deeper than the steel skin of the PC2E/10 MHz. The insides of its cleverly styled case match the layout and utility of the IBM PC and XT. Two full-height disk drive bays are available, side by side. In the PC2E/10 design, however, only the right one is divided in half and exposed to the outside world. The left slot is designed solely for full-height hard



The ALR PC2E/10 MHz looks like a miniature AT, and inside it matches the layout and utility of the PC and XT. There are two full-height disk drive bays, although only the right side opens to the outside. Five full-length expansion slots are available, two of which use the full 16-bit AT bus. The system board sports a built-in capacity of 1 megabyte of RAM.

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ALR PC2E/10 MHz
Advanced Logic Research Inc.
10 Chrysler Ave.
Irvine, CA 92718
(714) 581-6770
List Price: $2,995, includes display, adapter, and hard disk; base model, $1,545.
In Short: An 80286-based XT compatible with two AT-style 16-bit expansion slots, three 8-bit slots, AT-speed hard disk, and 10-MHz performance.
CIRCLE 660 ON READER SERVICE CARD

disk drives (or a single half-height device), hidden from the world behind the pretty face of the case. All drives mount with AT-style rails.

In the evaluation unit, the internal hard disk bay was filled with a Seagate 20-megabyte hard disk with 40-millisecond average access time.

Behind the disk drive bays is a small Astec power supply, capable of generating 130 watts of DC. Although modest by AT standards, it should be adequate enough for any conceivable expansion of the PC2E/10 MHz.

Underlying a little more than the left half of the chassis is the ALR system board. Although the Chips and Technologies' VLSI implementation of AT architecture is plainly present, the ALR board is overflowing with discrete components.

In fact, the various ICs are so tightly crowded that there's little room for expansion slots. The PC2E/10 MHz has but five full-length slots, spaced at the XT-standard .8-inch increments. Only two of these slots make use of the full 16-bit AT bus; the remaining three use the 8-bit XT bus.

In all versions of the PC2E/10 MHz, even those without a factory-installed hard disk, one of the two 16-bit slots is filled with a hard disk controller (a Western Digital unit in the machine we tested), leaving a solitary slot for 16-bit expansion.

INCLUDES DISPLAY As standard equipment, one of the 8-bit slots is also filled with a monochrome display adapter that emulates Hercules graphics modes. This adapter also provides a parallel port. The PC2E/10 MHz system also includes a matching TTL monochrome display (which may be either a Quimax or Samsung monitor) in its base price.

Despite its small five-slot endowment, the PC2E/10 MHz chassis allows for eight expansion card retaining brackets. One of those not associated with an expansion slot is used to hold the XT-style male DB-25 connector used for the built-in serial port.

In most cases, 16-bit expansion may prove unnecessary because the ALR system board has a built-in capacity of 1 megabyte of RAM (in 120-nanosecond, 256K-bit chips), which is ordinarily divided into 640K bytes for DOS and 384K extended memory suitable for VDISK. The machine can be configured with other memory options, including 256K, 512K, and 640K total RAM, in various arrangements of 64K-bit and 256K-bit chips.

The PC2E/10 MHz has the full megabyte factory-installed. The base model, without hard disk, is equipped with 512K bytes of RAM. All memory chips are socketed, but unfortunately half the sockets underlie the left drive slot. Upgrading or repairing RAM chips may entail removing the system board.

Other features built into the PC2E/10 MHz system board include a clock, serial port, and control circuitry capable of handling two floppy disk drives (both double-sided, double-density, and high-density, 1.2-megabyte units). One high-density drive is supplied as standard equipment. Although a data-and-control connector is installed for a second floppy disk drive because the power supply features only two DC connectors for running disk drives, you'll need a wye cable to add a drive to a two-disk-drive PC2E/10 MHz.

A system board battery maintains the clock and AT-style CMOS (complementary metal oxide semiconductor) system configuration memory when the power is off. The thin lithium battery, identical to those used on many popular multifunction boards, can easily be replaced.

The PC2E/10 MHz keyboard follows the original AT layout, with enlarged Enter and Shift keys, function keys on the left, Esc on the right, combined numeric and cursor pad, and indicators for the locking toggle keys. The feel is substandard, and so is its workmanship. This machine demands a better keyboard.

The combination of fast processor, wide bus, and quick hard disk made the ALR PC2E/10 MHz the performance leader of the machines examined here.

AT&T 6300 Plus

The AT&T 6300 Plus from AT&T Information Systems ventures about as far as you can get from the IBM standard and yet still maintains some truth to its claim of PC compatibility. Whatever the reason for the original design—corporate pride or product differentiation—the 6300 Plus is an entirely different breed of computer. Made in Italy by Olivetti, the 6300 Plus makes claims to AT compatibility based on seven expansion slots into which ordinary 8-bit PC-style cards will fit. Three of those slots also have a proprietary bus extension—another connector at the far end of the slot—that allows the use of full 16-bit proprietary AT&T expansion products.

One slot is saved by the AT&T video adapter, which semipermanently mounts at the left edge of the expansion bus card. This large card will handle both text and graphics in color (with higher resolution than an IBM EGA but incompatible with it) or monochrome using AT&T displays—and only AT&T displays. The AT&T monitors get their electrical nourishment as well as their video signals through a fat, proprietary cable and connector.

The original AT&T 6300, to which the

PC MAGAZINE FACT FILE

AT&T 6300 Plus
AT&T Information Systems
1 Speedwell Ave.
Morristown, NJ 07960
(800) 247-1212
List Price: With 20-Mbyte hard disk, 360K-byte floppy disk drive, $3,675; keyboard, $150; monochrome monitor, $295; color monitor, $795; MS-DOS 3.1, $65; UNIX System V, $395.
In Short: An 80286-based XT compatible with proprietary 16-bit expansion; a 6-MHz, no-wait-state clock; and medium-performance hard disk. It rates as the least expensive AT&T system with UNIX capability.
CIRCLE 679 ON READER SERVICE CARD



The chassis of the AT&T 6300 Plus is unusually tall because of its stacked two-piece system board layout. Only the seven 8-bit expansion slots and the power supply are visible on top. Although the machine does not offer true XT compatibility, it has the important attribute of being able to run UNIX flawlessly.

THE ITALIAN CONNECTION

AT&T went to great lengths a little while back to clear up the confusion over its retreat from the personal computer market and its hand-over to Olivetti. I'm not sure why the company thought it was so confusing; I thought it was pretty simple: it had trouble convincing anyone that it was a computer company.

Olivetti may fare better in that regard, but they've got some work to do. The 6300 Plus is in many ways an AT masquerading as an XT, but it's also a specialized machine. The hardware modifications that make it possible to run UNIX and DOS at the same time make it impossible to run 286 DOS at all. Both AT&T and Olivetti have the expertise to design a machine without this limitation, and it will clearly be the next product we'll see from that quarter.

Meanwhile, AT&T has increased its holdings in Olivetti. Obviously, AT&T has faith in the PC market and in its ability, through Olivetti, to be a player.

—Bill Machrone

6300 Plus is outwardly identical, seemed to presage reduced-footprint ATs because of its narrow but tall chassis (6½ by 15 by 17 inches). It's tall not because of extra room for big AT-style expansion boards but because of its unusual stacked two-piece system board layout.

The chassis is narrow because it has but a single full-height disk drive bay, already equipped with a half-height double-sided, double-density floppy disk drive on the bottom (as drive A:) and a 20-megabyte medium-performance Seagate hard disk (as drive C:) on top. The floppy disk controller, which is built into the system board, will also handle high-density (1.2-megabyte) floppy disk drives. Serial and parallel ports and a clock are also standard parts of the system.

Prying off the top lid of the 6300 Plus reveals only one part of the system board—its expansion slots—and the 6300 Plus power supply. The real guts are tucked underneath the upper level. Remove the bottom of the chassis (loosen two captured screws and slide it forward and then down), and you will have access to the other half of the system board and all its active components.

Among them is a 6-MHz, no-wait-state 80286 microprocessor and a socket for an 80287 numeric coprocessor. Standard memory hidden here includes two nine-chip, parity-checked rows of 256K-bit RAM chips, totaling 512K. Up to 1 megabyte can be installed on the system board, and DIP switches allow you to assign 640K bytes of that to DOS and the other 384K as extended memory.

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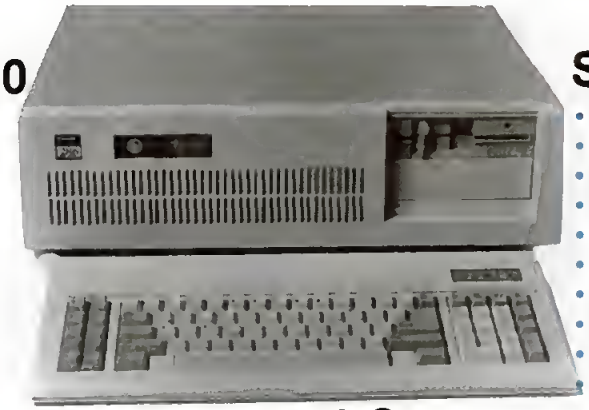
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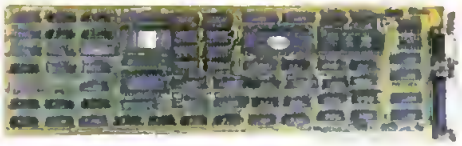
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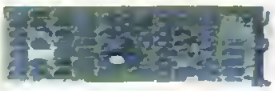


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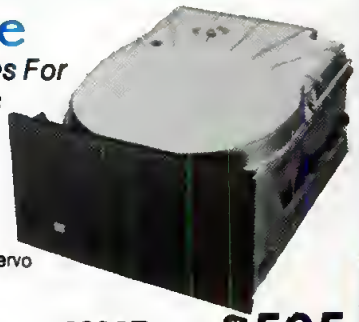
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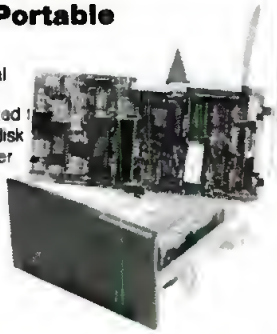


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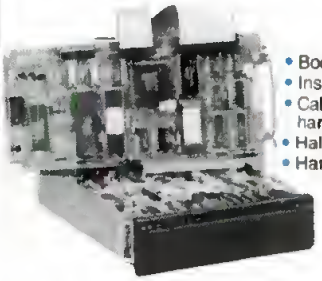
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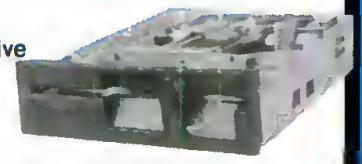
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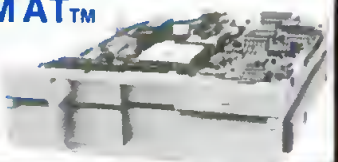
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CIRCLE 228 ON READER SERVICE CARD

80286-Based XTs: Summary of Features

Product	List price	Slots: 8-bit	Slots: 16-bit	Slots: AT or proprietary	Speed (MHz)	Wait states	Half-height Disk Drive Bays: Externally accessed	Half-height Disk Drive Bays: Internal location	Standard floppy disk drive	Hard disk capacity	Serial ports	Parallel ports	Standard RAM
ALR PC2E 10 MHz	$2,995	3	2	AT	10	1	2	2	1.2 Mbytes	20 Mbytes	●	●	1 Mbyte
ITT XTRA XP	$2,995	4	1	Proprietary	6	0	2	0	360K	20 Mbytes	●	●	512K
AT&T 6300 Plus	$3,675	4	3	Proprietary	6	0	2	0	360K	20 Mbytes	●	●	640K
IBM PC-XT Model 286	$3,995	3	5	AT	6	0	4	0	1.25 Mbytes	20 Mbytes	●	●	512K

—Indicates Editor's Choice ●—Yes ○—No

While this feetures table may, at first glance, suggest more similarities then differences between the 80286-based XTs, each machine in this new category has been designed in a unique way. For example, the number of 16-bit expension slots varies from 1 to 5; the total number of slots ranges from 5 to 8. Inevitably, some of the 80286-based XTs, most notably the ALR PC2E 10 MHz, look and behave more like ATs, while others seem more like XTs.

And because the prices of the 80286-based XTs correspond to those of the least-expensive AT compatibles, the market niche for these machines remains somewhat ill defined.

SLOW HARD DISK Not only does the modestly performing Seagate disk drive handicap the performance of the 6300 Plus (a high-performance 40-megabyte hard disk with a 36-millisecond average access time is also available from AT&T), so does the disk controller card, which connects to the system through the 8-bit bus. Data transfers are effectively limited to half-speed.

Another AT&T aberration is the 6300 Plus keyboard, which is sold as an extra-cost option. Its layout most closely resembles the original PC layout with small Return key and combined numeric and cursor keypad at the right, but to make the keyboard match the narrow width of the 6300 Plus system unit, the function keys have been moved to the top row. Of course, you'll probably be able to accommodate yourself to the other little variations (including the particularly inconvenient Ctrl key) with a little practice.

On the other hand, the feel of the AT&T keyboard is wonderful. It offers both tactile and audible feedback, but its clicks are quieter and more refined than the racket the IBM keyboard generates. The AT&T keys, however, are short-stroke—whether that's good or bad depends on your own preferences. In addition, the keyboard also features a built-in mouse port.

The 6300 Plus only nods in the direction of XT compatibility, but it salutes to UNIX and will run DOS as an application under UNIX System V using AT&T's *Simul-Task* software. If you can't wait for a multiuser, multitasking version of DOS, you might want to investigate UNIX on the 6300 Plus.

IBM PC-XT Model 286

Although it superficially resembles the original XT except for its nameplate, the IBM PC-XT Model 286 from IBM Corp. is full of surprises. The biggest of these is that it runs faster than the original AT because of its 6-MHz, no-wait-state microprocessor.

Outside of its radically updated system board, however, the new XT is changed little compared with its 8088-based forebears. That old familiar case is laid out identically to the older machines, two full-height disk drive bays in front (one occupied by a full-height hard disk and the other allowing the use of two half-height devices), eight expansion slots on the left, and a chrome-plated power supply at the right rear.

That power supply, however, has been subtly upgraded from 135 to 157 watts and now automatically detects the frequency and voltage of the power line and sets itself up accordingly—just in case you plan on carrying the machine with you to Bali, Bermuda, or Bulgaria.

In the left disk drive bay is the most unfortunate aspect of the XT Model 286, a standard hard disk that is unchanged from the one in the 20-megabyte 8088-based XT. A Japanese-made IBM-brand unit with a torpid band-stepper head-positioning mechanism, it rates among the slowest in creation. Although IBM tallies its average access time as 85 milliseconds, when tested it creaked along at 95 milliseconds.

The standard floppy disk drive is an AT-style 5¼-inch, half-height, high-density device with 1.2-megabyte DOS-formatted capacity. The XT Model 286 can handle a second high-density disk drive, a double-sided, double-density (360K-byte) 5¼-inch disk drive or a 720K-byte capacity 3½-inch disk drive in the remaining half-slot.

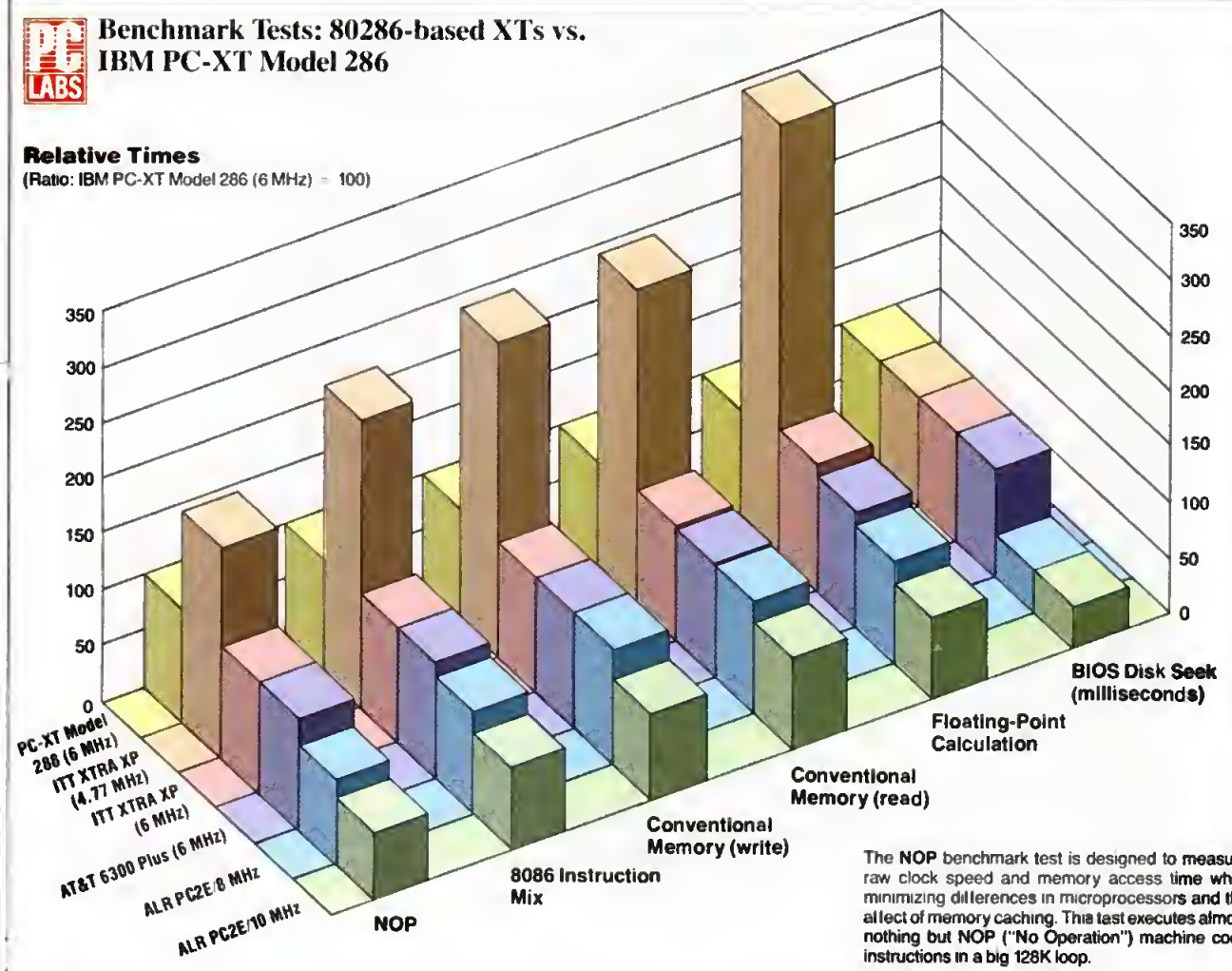
Both the hard disk and floppy disk drive run off the same controller card, apparently a reduced-size model of the one used in the AT (its on-board VLSI chips bear a Western Digital copyright notice). The controller connects through the 16-bit expansion channel and has the capacity to

FACT FILE

IBM PC-XT Model 286
IBM Corp.
Information Systems Group
900 King St.
Rye Brook, NY 10573
(914) 934-4488
List Price: $3,995
In Short: An 80286-based XT with five AT-style 16-bit expansion slots, three 8-bit slots, slow hard disk, and 6-MHz, no-wait-state performance.

CIRCLE 878 ON READER SERVICE CARD

Benchmark Tests: 80286-based XTs vs. IBM PC-XT Model 286



Aside from its small footprint, smart styling, and accessible price, our Editor's Choice 80286-based XT compatible, the ALR PC2E/10 MHz, clearly outperforms the IBM PC-XT Model 286 and other machines of this class for two simple reasons: Advanced Logic Research markets it with a 10-MHz clock speed and has installed a speedy, AT-like, high-performance Seagate 20-megabyte hard disk.

Performance Times

(Times given in seconds except where noted)

Product	NOP	8086 Instruction Mix	Conventional Memory (write)	Conventional Memory (read)	Floating-Point Calculation	BIOS Disk Seek (milliseconds)
IBM PC-XT Model 286 (6 MHz)	5.6	9.6	1.3	1.3	38.1	98.1
ITT XTRA XP (4.77 MHz)	10.5	24.8	3.6	3.6	147.1	97.8
ITT XTRA XP (6 MHz)	5.6	10.0	1.3	1.3	44.0	97.7
AT&T 6300 Plus (6 MHz)	5.6	10.1	1.3	1.3	40.0	96.8
ALR PC2E/8 MHz	4.2	8.9	1.3	1.3	35.4	38.9
ALR PC2E/10 MHz	3.4	7.2	1.0	1.0	28.0	38.9

The **NOP** benchmark test is designed to measure raw clock speed and memory access time while minimizing differences in microprocessors and the affect of memory caching. This test executes almost nothing but NOP ("No Operation") machine code instructions in a big 128K loop.

The **8086 Instruction Mix** benchmark test measures the time it takes to execute a selected series of processor-intensive tasks. The test program uses 8086 instruction code. These instructions are a subset of the total processor instruction set.

The **Conventional Memory** benchmark test allocates 256K bytes of conventional memory and treats it as a series of 64-byte records. Then, 16,384 random records are read into and written from this memory.

The **Floating-Point Calculation** benchmark test measures processor speed by looping through a series of floating-point calculations, including multiplication, division, exponentiation, and logarithmic and trigonometric functions. The benchmark program uses the floating-point library included with Microsoft C Compiler 4.0.

The **BIOS Disk Seek** benchmark test measures the time it takes to do a random seek using the disk's ROM BIOS. The test result includes minimal software overhead and may not parallel the manufacturer's claimed average access time. The test program performs 1,000 seeks. The average result is shown in milliseconds.

control up to two floppy disks and two hard disks.

Five of the eight expansion slots in the XT Model 286 use the full 16-bit AT-style data bus. Both short slots (those adjacent to the power supply) and slot one (the leftmost when viewed from the front) remain 8-bit-only.

The XT Model 286 is factory-equipped with a full DOS complement of 640K bytes of RAM. A system board jumper allows you to defeat the last 128K of this amount for whatever specialized application you might have. Using 16-bit expansion boards, the total system memory of the XT Model 286 can be extended to 12.6 megabytes.

■ Unless you make the deal of the century, the XT Model 286 is best bought only if the IBM logo is all-important to you.

The only empty socket on the system board is designed for an 80287 numeric coprocessor.

CONVENIENT BATTERY HOLDER

As with the AT, the XT Model 286 has a built-in clock that's kept running by a lithium battery while the system is powered down. The one real advance in the new XT is its battery holder, which slightly protrudes from the back of the system unit, allowing you to replace the 6-volt Panasonic-type BR-E2 battery without prying the lid off the computer.

Standard equipment in the XT Model 286 also includes a special new combined serial and parallel port adapter card. The parallel port uses a standard IBM-style female DB-25 connector, and the serial port uses an AT-style male DB-9 connector.

The standard keyboard shipped with the XT Model 286 is the 101-key enhanced model that is now standard throughout IBM's line of personal computers. Esc is in the upper left, 12 function keys line the top margin, and a T-shaped cursor pad and other control keys separate the alphabet keys from the numeric keypad. The feel is standard IBM, although a bit tighter and thinner-sounding than older models.

The XT Model 286 is potentially the most readily expandable machine of those listed here, but unfortunately, it's more costly than many AT compatibles that are even more expandable (and generally useful). At half its price, the XT Model 286 would rate as an excellent computer (except for its laggardly hard disk) and an excellent buy, but at its full retail listing it scores only as an also-ran. Unless you make the deal of the century, the XT Model 286 is best bought only if the IBM logo is all-important to you.



It may look like a plain old XT, but the IBM PC-XT Model 286 packs quite a few surprises inside. There are two full-height disk drive bays, one holding the slow IBM-brand hard disk and one divisible into two half-height spaces. Five of the eight expansion slots use the full 16-bit AT-style data bus. Both short slots and slot one (the leftmost) remain 8-bit.

TAKING THE BUS

The expansion buses of the machines reviewed here rank as the biggest difference and a principal dividing line between them. The alternatives are two-fold: those that use the AT-compatible 16-bit bus, and those that use the 8-bit XT bus, as well as some proprietary bus extension to permit special, nonstandard 16-bit expansion. The differing bus designs give you differing expansion options.

All the systems are compatible with standard PC-style 8-bit cards. If you are planning to add ports, a modem, or almost any of today's display adapters, you should encounter no difficulties with any of these 80286-based XTs (except the AT&T 6300 Plus, which has its own built-in monitor adapter).

Memory and multifunction cards are another matter. To operate at the high speeds at which their 80286 microprocessors are capable, these systems require a 16-bit interconnection to their memory boards. The boards with proprietary 16-bit buses limit you to only memory expansion products made by the manufacturer of the machine. With most systems, the issue is moot because they allow a full DOS complement of 640K bytes of RAM to be installed on their motherboards. For most applications, no other memory expansion is needed.

In the future, however, the need for AT-style expansion connectors may become more important. New, high-performance display adapters are being engineered around a 16-bit host interconnection. High-speed network adapters and other connectivity accessories may require it. The AT-style 16-bit expansion connector is thus a link with future applications.

Another bus distinction in these 80286-based XTs is the hard disk interconnection. The hard disk controllers of some of these systems use the ordinary XT 8-bit bus. Others use the 16-bit bus. The latter scheme offers an increase by a factor of two in the speed at which you can transfer data between the disk and the system.—**Winn L. Rosch**

ITT XTRA XP

Both the oldest and smallest of the 80286-based XT compatibles, the ITT XTRA XP rated as an engineering masterwork when it was first released by ITT Information Systems. Not only did it bring the speed of the 80286 into the realm of the ordinary XT, it squeezed all that power into a tiny system unit only 14 inches wide, about 16 inches deep, and 5 inches high.

One of the XTRA's greatest virtues also stands as its biggest liability—its complete XT compatibility all the way down to its bus structure. Although the AT had already been introduced when the XTRA was announced, the latter machine was equipped solely with the ordinary 8-bit bus of the XT. Consequently, the XTRA's 6-MHz, no-wait-state microprocessor (which can be slowed to 4.77 MHz, for optimum compatibility) will outrun a base-model AT operating at the same speed (it's almost as quick as an 8-MHz AT) when dealing solely with on-board memory. Access a disk or an expansion card, however, and the XTRA lags behind.

The problem is compounded by a slow disk drive that turns in an average access time about twice that of an AT disk drive, but in close competition with that in the XT Model 286. While disk directories snap onto the screen with an AT, they roll by at a readable rate on the XTRA.

The XTRA achieves its small size by skimping on disk drive slots and using the whole bottom of its chassis for a large system board.

One full-size disk drive bay is all that fits, and it comes equipped with a double-sided, double-density (360K-byte capacity) floppy disk and a 10- or 20-megabyte hard disk. The floppy disk controller is built into the system board, and the hard disk uses a separate expansion card made by Xebec that connects through the XTRA's 8-bit expansion bus.

Only five expansion cards fit into the XTRA's small chassis, but they are spaced at the generous interval of 1 inch—.2 inch wider than the XT equivalent—so they will accommodate wider cards more easily than most of its competitors. Although all slots use the standard 8-bit XT bus available, one features an additional proprietary connector at its far end that can be used to expand the system memory with the full 16-bit bus width.

Sockets for 36 memory chips are soldered to the system board. In the review unit, only half of these were filled with 256K-bit 150-nanosecond dynamic RAM chips. An additional megabyte of memory was installed on a special expansion board, but, strangely, it did not appear as extended or expanded memory to the PC Labs benchmark tests.

Both parallel and serial ports are built into the system board. A socket for an optional 80287 numeric coprocessor is also available. The power supply, which is rated at 154 watts, is more than capable of running any option that you can squeeze into the tiny computer.

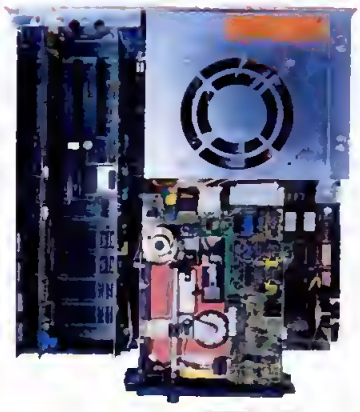
The XTRA keyboard most closely follows the original PC standard but slightly rearranges it, with the Left Shift key appearing between the Backslash and Z, the Enter key running horizontally (and labeled Return), and a separate Enter key replacing part of the enlarged Plus key in the combined cursor/numeric keypad. The keyboard has a light touch with little tactile or audible feedback.

The keyboard itself is heavy. It has two spring-loaded feet to adjust its slope to one

PC MAGAZINE FACT FILE

ITT XTRA XP
ITT Information Systems
2350 Qume Dr.
San Jose, CA 95131
(800) 321-7661
(800) 368-7300 (in Calif.)
List Price: With 512K RAM, 10-Mbyte hard disk, 360K-byte floppy disk drive, $2,995; with 20-Mbyte hard disk, 360K-byte floppy disk drive, $3,125; MS-DOS 3.1, $85.
In Short: An 80286-based XT compatible with proprietary 16-bit bus and 6-MHz, no-wait-state microprocessor.
CIRCLE 677 ON READER SERVICE CARD





The ITT XTRA XP is both the oldest and the smallest of the 286-based XTs. Its remarkably small system unit is only 5 by 14 by 16 inches. There is but one full-size disk drive bay, which holds a floppy and a hard disk, and only five expansion slots, spaced 1 inch apart. The display's height and width match the width of the system unit, giving the computer a distinctive appearance.

PC MAGAZINE EDITOR'S CHOICE

The biggest choice you face is whether to buy an 80286-based XT compatible at all. Your reason for selecting that particular style of computer—probably a mixture of cost considerations and brand loyalty—will indicate which machine is best for you.

Of the foursome examined here, however, Advanced Logic Research's ALR PC2E/10 MHz stands out for several reasons: styling, performance, and price. It looks good, runs faster than any of the others, and costs less. Its single free 16-bit slot may prove to be something of a handicap if you're planning on a lot of expansion—but then again you should be considering a full-size AT if that's your goal. Although from a security and support standpoint a machine from a company with "International" in its name might help you sleep better, we'd feel little reluctance about putting the ALR PC2E/10 MHz on our desktops.

of two angles. The keyboard surface below the Spacebar has been extended as a hand rest, and the keys are surrounded by a framelike design. There is no pencil rest at the top.

ITT has designed some interesting aesthetics into the machine. The monitor is designed to be the same width as the XTRA XP—put the monitor on top and the system looks like an electronic troll—and the monitor's height also matches the XTRA's width. You can stand the XTRA on end next to the display and make the system look like a one-piece refugee from the Museum of Modern Art.

The glory days of the ITT XTRA XP are gone. Although it's a solid, workable computer, its future is limited by its 8-bit expansion. PC

Winn L. Rosch is a contributing editor of PC Magazine.

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CIRCLE 241 ON READER SERVICE CARD

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PC SECURITY MODEMS

As an increasing number of PCs are being used for such applications as accessing a corporate bulletin board or database, users are looking for new ways to secure their systems from unauthorized access. The solution must succeed in thwarting all unauthorized access without also making authorized access too unwieldy for the user to gain.

One solution is to provide security through the communications software on

Protecting your data from prying PCs is the forte of the two modems we review here: the Cermetek Security Modem and the Anderson Jacobson 2412-AD3H.

the PC. This usually means password protection. Unfortunately, the designers of operating systems and communications software for the PC often add security features as an afterthought. These systems can have flaws ranging from "backdoors" (passwords left by the system designer, which work on all copies of that software) to password files stored as plain DOS text files that can be read by anyone who logs on or has access to the PC.

It is often easier, however, to add security by using a special modem. Both of the modems reviewed here provide levels of data protection ranging from simple passwords to full callback. Other modems offer these capabilities as well; look for reviews in an upcoming issue.

PASSWORD SECURITY Both the Cermetek Security Modem, from Cermetek Microelectronics, and Anderson Jacobson's AJ 2412-AD3H store up to 24 passwords and require the caller to enter a password before he is given access to the host PC. They prevent unauthorized people from using your PC and modem to call other computers unless they enter a password.

ANSWERBACK PROTECTION While password protection allows access to a computer by people who have specific knowledge (the password), answerback protection allows access by people with specific equipment. Answerback systems have several advantages. The most obvious is that there is nothing to forget. The answerback process is simple. When the host system answers the call, it sends a code to the caller called WRU for Who aRe yoU. When the caller's system receives the WRU, it sends back a short message called its answerback. The caller can access the system only if its answerback is acceptable. Since all of this happens in only a few seconds without operation intervention, you are not inconvenienced. Answerback has been used for many years by the Telex network and is well proven in the field.

PC MAGAZINE FACT FILE

Cermetek Security Modem
Cermetek Microelectronics Inc.
1308 Borregas Ave.
Sunnyvale, CA 94089
(408) 752-5000
List Price: $595
Requires: RS-232 serial port, communications software.
In Short: A 1,200-bit-per-second external modem with security features including keylock, password, and callback.

CIRCLE 654 ON READER SERVICE CARD



Unlike the AJ 2412-AD3H modem, the Cermetek Security Modem can be programmed for passwords and callback numbers only when the key is inserted. It is completely Hayes compatible.

Photographs: Thom O'Connor

CALLBACK PROTECTION Callback protection verifies your location. After you have entered your password into a callback system, the host computer will hang up the phone and call you at the number associated with the password you entered. Both these modems insert a random delay before dialing, to further confuse unauthorized users.

While callback systems are generally considered to provide the ultimate in security, they also create obstructions. Since the host computer calls you back, callback security is not appropriate for users with acoustic couplers, for traveling salesmen, or for other applications in which a user can call from more than a few locations.

THE MODEMS While the Cermetek Security Modem and the AJ 2412-AD3H provide similar features, there are some significant differences between them. Both of these modems are Hayes compatible and provide password and callback protection if desired. All the security fea-

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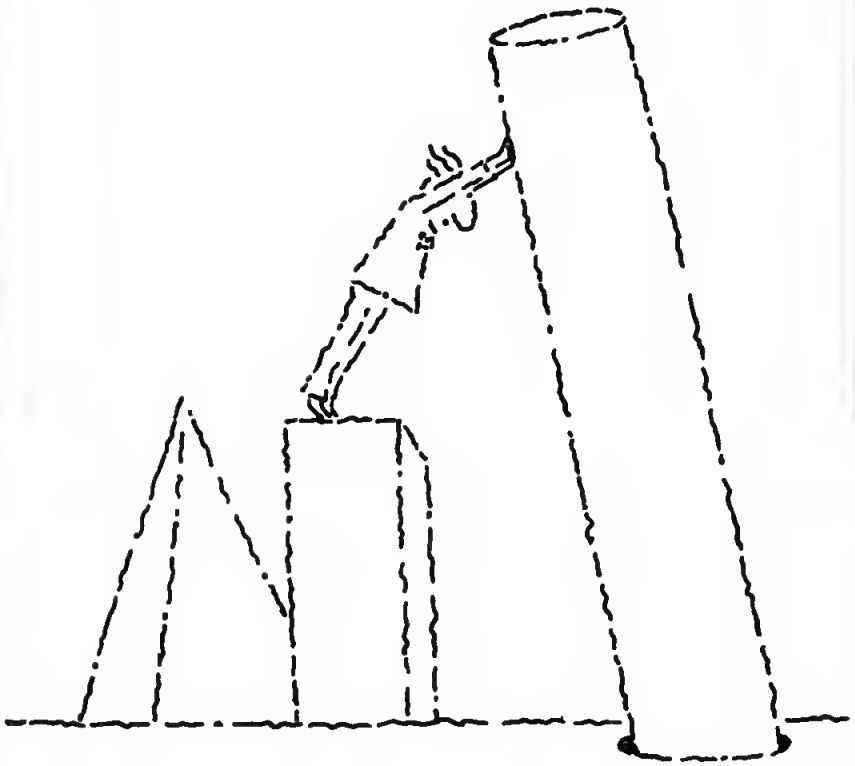


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SOUNDING OUT THE MODEMS

If the telephone line to your house is quiet enough for you to hear a pin drop without all the fancy equipment they use in Sprint commercials, then just about any modem you use will be able to send and receive data without error. Unfortunately some of us have to live in the real world, where the phone sometimes makes us sound like we are talking from the bottom of a barrel of Rice Krispies. My own telephone picks up one of the local news stations clearly enough for me to listen to the hockey game scores.

For most people, the main difference between two modems with similar features is their relative ability to transmit and receive data on a noisy telephone line. The modem that works on a bad Allnet or US Telecom line can save several times its cost in reduced long-distance charges over its working life. If you live in a remote area where the lines are long, noisy lines may be a way of life.

Modem manufacturers are not much help since there are no standards for clean, average, and noisy lines. At best, you may get a bit-error-rate figure like 1 in 10^6. These numbers are truly meaningless since they do not indicate the line conditions at the time of testing.

To help you find the right modem, PC Labs has acquired a TAS Voiceband Channel Simulator and modem test unit. The channel simulator can be programmed to simulate varying levels of 12 different phone line problems. The modem test unit provides accurate and repeatable data to the modems and reports errors to the attached PC.



PC Magazine Labs' new TAS Voiceband Channel Simulator (bottom) can be programmed to simulate 12 different phone line problems. The accompanying modem test unit (top) sends repeatable data to the modems and reports transmission errors to an attached PC.

In the testing for this article, the phone line connector of the modem to be tested is connected to the channel simulator, and the modem tester is connected to the RS-232 port on the modem. Also connected to this equipment is a Hayes Smartmodem 2400, which is used as a reference. PC Labs has created noise and other line defect levels for our best estimates of good, average, and worst-case telephone lines. The good lines are essentially clean, with defect levels set to be as good as the top 10 percent of AT&T's lines. The worst-case line conditions are so bad that 95 percent of AT&T's lines are as good as or better than our test. These figures come from studies of line quality published by AT&T before divestiture and represent both local and long-distance calls.

The object of the testing is to measure the relative immunity of various types and brands of modems to noise in general and to specific types of noise, such as white noise, phase jitter, and amplitude jitter. The modem tester sends 100 blocks of data, each of about 4,800 bits, and measures the number of errors. If too many errors occur, the level of the type of noise being measured is reduced and the data sent again. This gives us a figure that represents the maximum level of noise through which this modem can work. These tests are repeated for each type of noise—data sent from the modem under test to the Hayes modem, data sent from the Hayes modem to the modem under test—and on lines of varying quality for each speed the modem supports.

By the time testing is completed, each modem has sent or received a minimum of a quarter of a megabyte.

—Howard Marks



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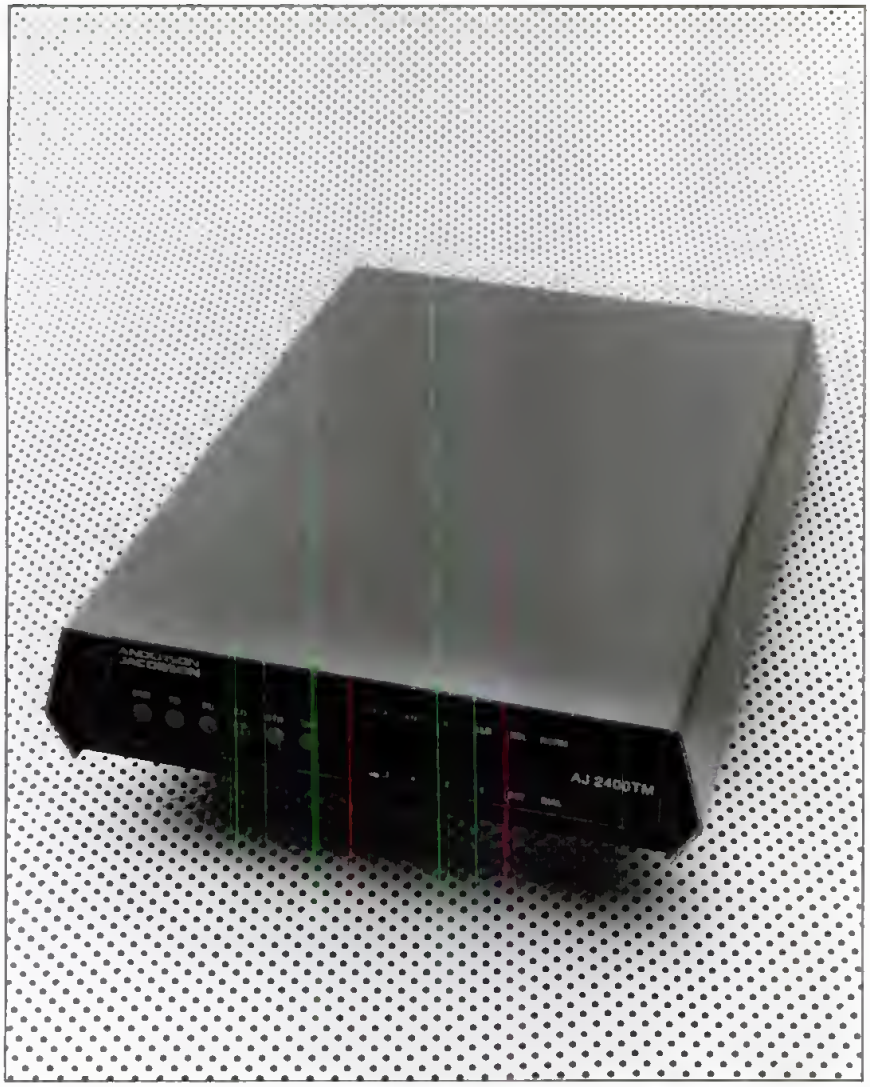
Benchmark Tests: Hayes Smartmodem 2400 vs. AJ 2412-AD3H and Cermetek Security Modem

At 1,200 bits per second the AJ 2412-AD3H toleretes noisy lines better than the Cermetek Security Modem and Hayes Smartmodem 2400. However, at 2,400 bps it performs the same tests well below the Hayes Smartmodem standard. Though both the Smartmodem and AJ 2412 incurred some data transmission errors at 0 percent in the Amplitude Jitter test under worst-case line conditions, many modem programs will retry transmission until data gets through without error. The reel loss is in time only.

	Mode	Signal-to-Noise (decibels)		Phase Jitter (degrees)		Amplitude Jitter (percent)	
		Average Line	Worst Line	Average Line	Worst Line	Average Line	Worst Line
1,200 bps							
Hayes Smartmodem 2400	Originate	8	20	N/A	N/A	N/A	N/A
	Answer	9	24	N/A	N/A	N/A	N/A
Cermetek Security Modem	Originete	12	12	N/A	N/A	N/A	N/A
	Answer	12	14	N/A	N/A	N/A	N/A
AJ 2412-AD3H	Originate	6	9	N/A	N/A	N/A	N/A
	Answer	8	9	N/A	N/A	N/A	N/A
2,400 bps*							
Hayes Smartmodem 2400	Originate	16	20	20	20	25	5
	Answer	20	24	20	15	20	0
AJ 2412-AD3H	Originate	20	32	15	10	20	0
	Answer	24	40	15	15	25	10

N/A—Not applicable: 1,200-bps modems are not substantially affected by phase or amplitude jitter.
*The Cermetek Security Modem is 1,200 bps only.

The PC modem performance tests use the TAS Voiceband Channel Simulator and a modem tester to measure the relative immunity of various types and brands of modems to general and specific noise. The modem tester sends 100 blocks of data holding 4,800 bits each and measures the number of transmission errors. If errors occur, the level of the type of noise being measured is reduced and the data sent again until zero errors occur. This gives a figure that represents the maximum level of noise that this modem can work through. These tests are repeated under various types of noise, such as signal-to-noise, phase jitter, and amplitude jitter, while data is exchanged between the test modem and the Smartmodem at Originate and Answer modes on lines of average and worst-case quality for each speed the modem supports.
Originate mode is normally used to initiate a call, while **Answer mode** is used when answering a phone. A Hayes Smartmodem 2400 was used as a reference modem in the opposite mode of the modem being tested.
The **Signal-to-Noise** test increases the signal strength until it is heard by the other modem without errors. The ratio of the signal-to-noise is measured in decibels. Each 3 decibels representa a doubling of the ratio, so at 3 decibels the signal is two times louder than the noise, at 6 decibels it is four times louder, and so on. A lower number indicates a more sensitive modem that reacts better on a noisy line. The induced noise is called "white noise," which is the "hiss" normally heard in the background.
The **Phase Jitter** test introduces a momentary phase shift on the modem signal. An ideal telephone line has no phase jitter. A shift in modem signal phase is measured in angular degrees. Modems that can tolerata high phase jitter angles are more robust.
The **Amplitude Jitter** test changes the amplitude of the modem's signal, which is normally held constant. The effect is similar to rapidly turning the volume knob ot a stereo back and forth. Tha changes in amplitude are measured in percent difference from the other modem's actual signal. Modems that work through a high amplitude jitter percentage are preferred.



Anderson Jacobson's AJ 2412-AD3H modem stores up to 24 passwords and requires the caller to enter a password before he is given access to the host PC. Unauthorized access is impossible.

■ The AJ modem can store your log-in scripts for MCI Mail, your corporate mainframe, or other services you use.

tures of each modem can be either selected or disabled.

The AJ also protects your accounts and passwords on the computers you call. The modem can store your log-in scripts for MCI Mail, your corporate mainframe, or other services you may use. While most communications software can store log-in scripts, they are available to anyone using the PC. Most communications programs will even display your password every time they log on. Since all access to the memory of the modem requires the supervisor password, even people with access to

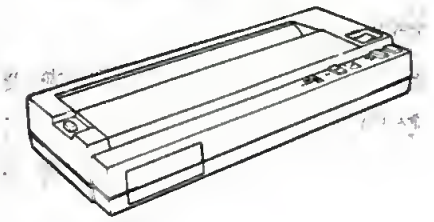
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CIRCLE 215 ON READER SERVICE CARD

HOW "HACKERS" BREAK IN

You have all heard of bands of computer trespassers who get their kicks by breaking into other people's computer systems. Sometimes, their goal is nothing more than to see if they can actually break in, but there are other situations in which this kind of activity can cause real security problems. These "hackers" have, over time, developed a veritable tool bag of techniques for breaking into your computer.

While they are generally after larger computers than PCs, as more PCs are put on-line they, too, will become targets. Particularly attractive to hackers are those systems that have confidential information available, such as in-house bulletin boards, and those with mainframe access.

■ The hacker can be defeated by making his life difficult. Most hackers will give up on a system that doesn't give in to their usual techniques.

A hacker's first step is finding the telephone number for your system. He may get it from a bulletin board, another hacker, one of your former employees, or by "fishing," or using a beige box. A "beige box" is a computer that calls all the numbers in an area and keeps track of those that answer with a modem's carrier tone.

Once he has your phone number, the hacker will begin to attack the password protection on your system. Password systems vary greatly as to the degree of protection they provide. The best ones require both an account number and a password before they will report an incorrect entry. This prevents a hacker from knowing when he has guessed a correct account and bad password. The system should also allow only a small number of tries before disconnecting; this prevents the hacker from using his beige box to try large numbers of passwords. A system that keeps a log of all log-in attempts can alert the system manager to hackers using the system.

Unfortunately, many systems make the hacker's job easier. They identify themselves so the hacker may learn that this type of system has account numbers four digits long and passwords eight characters long. Other systems allow the hacker to get help or a list of logged-in users before logging in. If the hacker has the names of logged-in users, he just needs to guess the password for one of them.

Users also make the hacker's job easier by using easy-to-guess passwords. Hackers often have a program in their beige box that guesses the 20 most common passwords. Common passwords include four-letter words, nicknames, and programmer's terms such as FUBAR.

Hackers even have techniques that work with some callback security systems. Some callback devices can be defeated by sending a dial tone down the line, so the callback device will think it is dialing when the caller is really still connected. Callback devices that use a second line to make the return call cannot be fooled by this technique.

The hacker can be defeated by making his life difficult. Most hackers will give up on a system that doesn't give in to their usual techniques. The first line of defense is a good password system: avoiding common passwords, changing passwords occasionally, and promptly disabling passwords of people no longer needing access will discourage most hackers.—**Howard Marks**

PC MAGAZINE FACT FILE

AJ 2412-AD3H
Anderson Jacobson Inc.
521 Charcot Ave.
San Jose, CA 95131
(408) 435-8520
List Price: $695. AJ also makes a 1,200-bit-per-second version, the 1212-AD3H, for $499.
Requires: RS-232 serial port, communications software.
In Short: A 2,400-bit-per-second external modem with extensive security features, including callback and password protection.
CIRCLE 855 ON READER SERVICE CARD

your PC will not have this sensitive information. Your assistant can even call the services without ever knowing the password.

All the options on the AJ modem can also be reprogrammed via the phone line. This feature is popular with data center managers who can reprogram the log-in scripts and change user passwords at the same time.

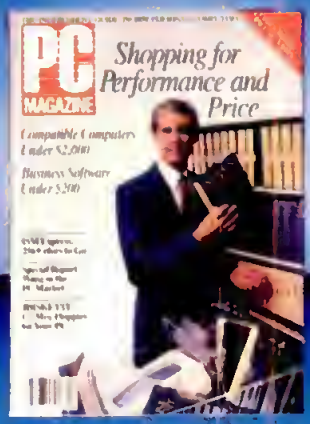
The Cermetek modem will place the return call on a second telephone line in order to defeat the hacker technique of line tying (see sidebar "How 'Hackers' Break In"). This feature is useful in areas with old telephone central offices in which the caller controls the line.

The other main differences between the two is the way in which stored information such as passwords and callback numbers are reprogrammed. The Cermetek Security can be programmed only when its key is inserted, while the AJ 2412 requires a master password.

The advantage of both these modems is that they provide a reliable measure of security without requiring extensive programming or cumbersome log-on routines that will frustrate authorized users. For offices or corporations with a bulletin board or database to protect from curious outsiders, it's a small price to pay for data protection. PC

Howard Marks is a freelance writer and the president of Networks Are My Life!, a New Jersey-based networking consulting firm.

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The Experts' View

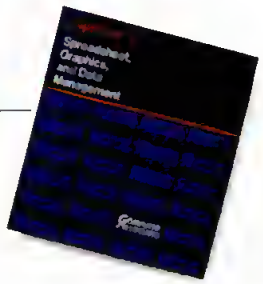
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CIRCLE 319 ON READER SERVICE CARD



Retire Your PC Coax Connection

The PC-to-host coax connection. She was a good piece of equipment working with coax cable and cluster controllers, but time just passed her by. End users started needing more than simple host access. They also needed their PCs to share resources around the office. That's when local area networks came along to fill the need.

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Orchid Technology's PCnet

Orchid's local area network, coupled with Novell's *NetWare*, is a flexible, hardworking system that's more than adequate for routine office automation. But if you're looking for blazing speed, you'll have to try elsewhere.

FRANK J. DERFLER, JR.

If you need to automate a medium-sized office, Orchid Technology's PCnet might just do the trick. It's flexible—fitting in with a variety of systems and software. It's easy to install and learn. It provides a way out of compatibility problems that other manufacturers don't address. And it's all available at a lower cost than many systems. However, if you're putting together a network to handle high-speed transaction processing, you might want to look into a faster system.

NETWARE, AGAIN The advertising copy for PCnet says it was the first LAN available for IBM PC systems. What's more, according to the documentation, the system used to come with its own PCnet local area network software; it's still available that way if you want it. The system we received for evaluation, however, included Novell's *Advanced NetWare/86* in Orchid Technology binders. (Orchid supplies a version of the NETBIOS for its boards, in case you want to run networking applications requiring this communications interface.) The rest of our package from Orchid comprised six PCnet network interface boards, some coaxial cable, and documentation. We tested the system on the same setup that we used for the rest of the articles in this series: a network using two 8-MHz ATs (with one acting as server), three standard PCs, and one XT.

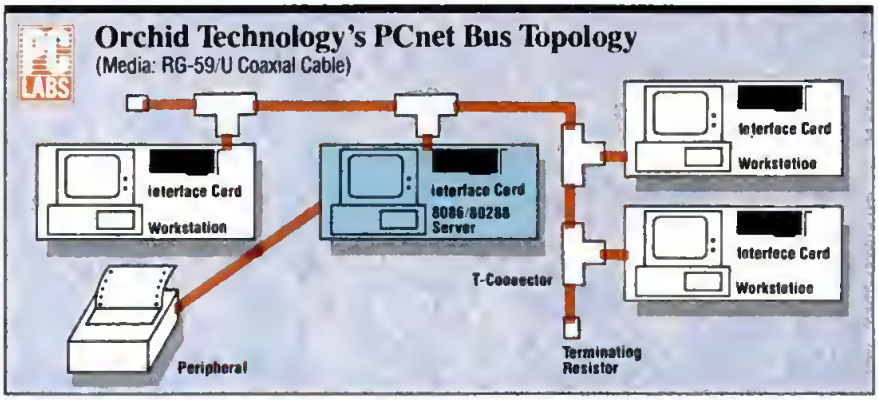
HOOKING UP PCnet uses a coaxial cable bus wiring system that runs from workstation to workstation, with each cable end capped with a coaxial termination re-

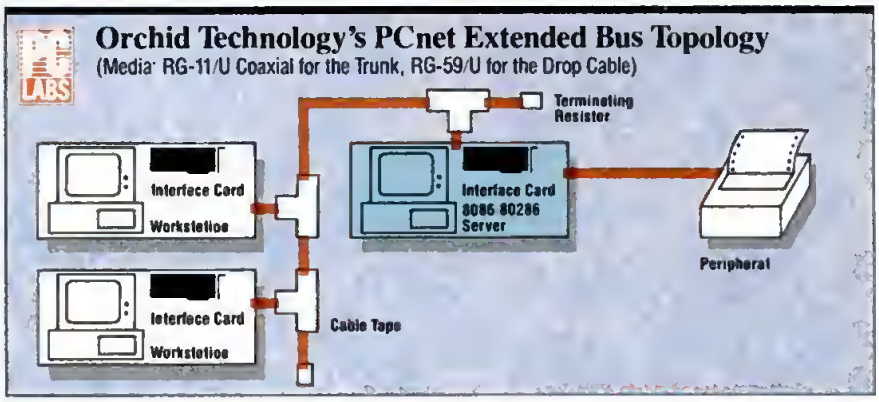
sistor. To hook our test network together, we used small-diameter RG-59/U cable, attaching it to each Orchid board with a T-connector. We could also have used larger RG-11/U cable, installing it as a main trunk with smaller drop cables connected to each workstation. Which scheme you choose depends largely on the extension of your network. The maximum length of RG-59/U you can use in a PCnet system is 3,000 feet; RG-11/U can be used in runs of up to 7,000 feet, with drop cables as long as 20 feet.

Access to the media is controlled through the CSMA (carrier sense multiple access) protocol, under which the network stations transmit only if the channel seems clear. This listen-before-talking scheme works particularly well for networks in which many stations make short transmissions or request the transfer of relatively small blocks of data. The scheme can become overloaded under heavy use, but it shouldn't reach its limit in systems using PC workstations and servers. Indeed, the server's hard disk will probably bottleneck before the media-sharing scheme does.

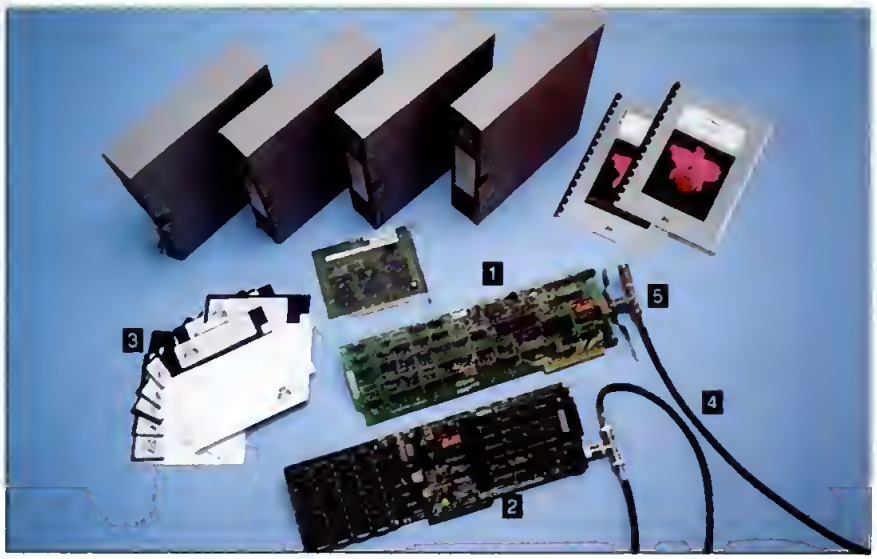
■ An LED on the PCnet network interface card flashes when the board is addressed, a handy indicator when you're troubleshooting.

In our setup, the PCnet hardware ran the *NetWare* adequately, if unspectacularly. More impressive was Orchid's selection of boards. The standard PCnet network interface card is a full-length circuit board equipped with a coaxial connector. It's easy to install; you aren't required to reset any jumpers or switches to configure this card for a standard IBM PC (though, depending on what other devices are installed, you might have to change a few). Also, a small LED on the card flashes when the board is addressed, a handy indi-





Workstations and the server on Orchid Technology's PCnet use either (1) the standard Orchid PCnet network adapter card or (2) the Orchid Conquest card with a network adapter attached as a daughtercard. We used an IBM PC AT as the server running under (3) Novell's Advanced NetWare/86. *Orchid's PCnet can be hooked together in two ways. The standard bus network, which can run up to 3,000 feet in length, uses (4) RG-59/U coax and hooks into the interface card with (5) a T-connector. The extended bus can be up to 7,000 feet long and uses RG-11/U coax as the trunk cable. Cable taps hook drop cables of RG-59/U coax up to 20 feet long from the trunk to a workstation. The interface cards use the (CSM) protocol to access the media.*



Photograph: Richard Lakin

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- NETBIOS Support

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If you own two or more PCs then you need *EasyLAN*™ version 3.0.

THE *EasyLAN* OFFICE NETWORK

EasyLAN shares printers and disk drives between IBM PCs. *EasyLAN* can save you $1,000 or more per PC by eliminating duplicate equipment purchases.

And now, you can run NETBIOS supported applications. Or you can write your own network applications for *EasyLAN* and other NETBIOS compatible networks.

EasyLAN VERSION 3.0 HIGHLIGHTS

- ***EasyLAN* shares printers, plotters, data, and disk storage**
- **Supports up to 18 PCs or compatibles**
- **New Network Commands**
- **New NETBIOS**
- **PC to PC file transfer**
- **Print spooling**
- **PBX support**
- **Easy to install**
- **Easy to operate**
- **Modem support**
- **Performs in the background**

EasyLAN's low price matches the small business user's cost-sensitive budget. It is the office network solution for less than $100 per PC.

EasyLAN performs its operations concurrently in the background. *EasyLAN* communications, file transfers and printer operations all take place while each PC simultaneously performs such normal DOS applications as Lotus 1-2-3,™ Wordstar,™ and dBASE.™

NEW NETBIOS SUPPORT—WRITE YOUR OWN COMMUNICATIONS PROGRAMS.

Programmers may use *EasyLAN* to develop network applications using NETBIOS (interrupt 5c). These applications can now be operated across the low cost RS 232 communications links used by *EasyLAN*. Our new *EasyCALENDAR* program is an example of a network application that uses NETBIOS for program-to-program communications.

Multi-user data base management applications that require a high overhead network operating system will perform faster on high-cost networks operating at megabit speeds.

NEW VERSION 3.0 COMMANDS EXPAND NETWORK FLEXIBILITY

EZCLOCK lets PC's attached to the network read the time and date from a single master clock on the central PC, eliminating the need to install individual clock boards in each PC and insuring that all file entries and updates made across the network are dated.

The EZ Make Directory and EZ Remove Directory commands function identically to the DOS MKDIR and RMDIR commands, and give remote users increased flexibility when it comes to managing subdirectories on the central PC.

EZBEEP lets you send an audible signal across the network, alerting a PC user that a file or message is being sent.

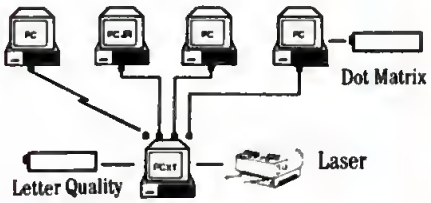
***EasyLAN* PBX SUPPORT BRINGS NEW FLEXIBILITY TO PC CONNECTIVITY**

With *EasyLAN*'s PBX support, users can share peripherals and transfer files using PBX switched circuit connections and existing twisted pair wiring. *EasyLAN* has already been installed on a number of different PBX's, and recently was certified by Northern Telecom for use on its Meridian SL-1.

"The value is high 🖳🖳🖳🖳*"*
—InfoWorld Report Card

Disk sharing uses *EasyLAN*'s EZCOPY command to move files to and from PC's. ASCII or binary files can be transferred in the foreground, or in the background while other DOS programs run.

Printer sharing operates transparently with existing programs. Print files are automatically spooled to disk and scheduled for printing. Multiple printers on the central PC may be designated for individual printing tasks.



***EasyLAN* Office Network**

EasyLAN SPECIFICATIONS

Each PC in the network requires an individual licensed copy of the *EasyLAN* program and takes 20k of memory on each satellite PC, a serial port, and DOS 2.0 or above. *EasyLAN* runs on all IBM PC models and compatibles. The central PC requires a serial port for each satellite PC. The COM2 and COM6 boards are serial port expansion boards which permit you to add serial ports to the central PC.

EASY TO INSTALL

EasyLAN can be installed in less time than it takes to enjoy your coffee break. Just plug the *EasyLAN* cables into existing serial ports. The *EasyLAN* Network Configuration Program provides menu driven installation program that will guide you step-by-step through the software installation process.

***EasyCALENDAR*—USE YOUR NETWORK TO SCHEDULE MEETINGS.**

The first of a new series of *Easy* network application products using NETBIOS is now available. *EasyCALENDAR* handles time management applications for individuals or a department and can be run on personal computers attached to any NETBIOS-compatible network.

Highlights:

CALENDAR MANAGEMENT for individuals and the work group

TASK MANAGEMENT to create, maintain and review to do lists

TODAY'S NEWS for broadcasting messages, notices or announcements across the network.

MENU INTERFACE for easy set up and use

EasyCALENDAR's Data base for appointments, to do lists and news resides on the central PC. Satellite PCs attached through *EasyLAN* version 3.0 send network transactions to the central data base to invoke *EasyCALENDAR* functions.

The *EasyCALENDAR* calendaring program requires *EasyLAN* version 3.0 and is priced separately.

EasyCALENDAR will be available March 1987. Advance orders are being accepted now.

"I bought access to a laser jet printer for less than $100."
—CONOCO Oil User

EasyLAN

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Server Technology, Inc., 1095 East Duane Ave. #103
Sunnyvale, CA 94086 Telex 5106003481

Item	Description	Price	Qty	Amount
EL 02	*EasyLAN* Kit—for 2 PCs 30' cable, two disks & manuals	$219.95	____	$ ____
EL 03	*EasyLAN* Expansion Kit—for 1 PC 30' cable, one disk & manual	$119.95	____	$ ____
EL 10	*EasyLAN* disk & manual (3½" disk $89.95)	$ 99.95	____	$ ____
EL 12	*EasyLAN* 30' cable	$ 49.95	____	$ ____
EL 13	COM2 serial port expansion board, two ports	$219.95	____	$ ____
EL 14	COM6 serial port expansion board, six ports	$489.95	____	$ ____
EC 01	Easy CALENDAR Kit Supports 6 PC's and 10 people	$199.95	____	$ ____
EL 15	Custom length cables, call for quote			
	CA res. add applicable sales tax			$ ____
	Shipping charge USA $10.00, other $20.00			$ ____
			TOTAL ORDER	$ ____

CIRCLE 520 ON READER SERVICE CARD

cator when you're troubleshooting certain hardware and software problems at the workstation level.

CONQUEST OF SPACE The game of saving expansion slots started with the release of the first IBM PC. There are simply never enough slots for all the add-ons; a network adapter card is just one more board looking for a home. Orchid helps solve the space problem with a three-in-one board it calls the Conquest.

The Conquest is a standard 8-bit multifunction board with memory, a parallel port, a serial port, and a clock/calendar with a backup battery and alarm. It also can carry up to 2 megabytes of expanded memory, adressed under the Lotus/Intel/Microsoft expanded memory specification. Indeed, you can fit the same system with as many as four Conquest cards for up to 8 megabytes of expanded memory, which won't lose data when you do a warm boot (Ctrl-Alt-Del). And where, you ask, is all the PCnet interface hardware? On an optional daughtercard that hooks into the Conquest.

That's a lot of hardware in one slot. For anyone with a PC loaded with disk and tape drive controller boards, a mouse interface, a video card, a modem, and other cards, the Conquest offers a way to squeeze more memory and a network interface into the system. In our tests, we tried both the standalone board and the Conquest in a standard PC. We had no trouble configuring the Conquest or getting it into the already-crowded expansion slots, and the network daughterboard operated exactly like a standalone card. Of course, the Conquest will also cost you about $300 more than the standard network interface. Still, depending on the needs and makeup of your network, the extra cost might be worth it.

■ Orchid Technology is the first company we've seen that gives network designers a way out of hardware contention problems.

HARDWARE CONTENTION PCnet also offers a weapon for the compatibility wars. Orchid is the first company we've seen that gives network designers a way out of hardware contention problems. Those problems arise when two or more boards in the PC require the same interrupt or the same direct memory access (DMA) channel. (These are the bus addresses that handle the information interchange between memory and I/O devices.) Only three DMA channels and a limited number of interrupt addresses are available for I/O devices, so the more communications and controller boards you load into a PC, the more likely you are to have contention problems. Computers that simultaneously act as disk servers and communications gateways on the network can simply run out of available DMA channels, because each of the devices they host demands its own channel. The PCnet instruction manual says the IBM PC 3270 SNA/SDLC communications boards and the Sysgen Image controller for a tape backup both use the same DMA channel as the default on the PCnet board. Certainly, many other devices have the potential to cause conflicts.

Unlike other manufacturers, however, Orchid gives you a tool to unlock hardware contention. Every PCnet interface card comes with a disk carrying a program called TRISTATE.COM. Running TRISTATE suspends the operation of the network adapter, so that some other (potentially conflicting) device can operate. In an actual system, you could suspend network operation with TRISTATE and perform a disk-to-tape backup using a tape system that would normally conflict with the network adapter. When the backup is completed, a few keystrokes bring the network adapter back on-line. Of course, this trick won't work if the conflicting device must be used at the same time as, or through, the network, but it does provide a solution to some conflict situations.

SOFTWARE CHOICES However good the hardware, it's the software that determines what the network can do. Each PCnet board includes its own version of the NETBIOS, so you can choose any of a number of NETBIOS-compatible software brands—3Com's networking software, for example, or IBM's PC *Local Area Network Program* or Torus Communications' *Tapestry*. Then again, you could try Orchid's own PCnet software. Or you could use what we used: the highly rated *NetWare*, from Novell, which you can buy bundled with the PCnet hardware. Actually, the system we tested came with *NetWare* repackaged in Orchid Technology binders. Orchid simply reprinted the Novell documentation, leaving out the information on using *NetWare* with non-Orchid hardware.

We reviewed Novell's *NetWare* in our special LAN issue (see "Making Connections: LANs Under NetWare," *PC Magazine*, Volume 5 Number 21). Here's a brief recap.

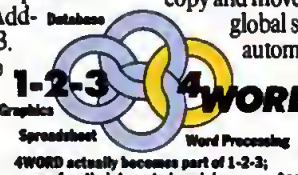
PC MAGAZINE FACT FILE

PCnet
Orchid Technology Inc.
47790 Westinghouse Dr.
Fremont, CA 94536
(415) 490-8586
Workstation Requirements: 256K RAM, DOS 3.1 or later.
Networking Software: *Advanced NetWare/86, PCnet*, NETBIOS-compatible software, including *PC Local Area Network Program* and *Tapestry*.
Media: Coaxial cable
Prices: Two-user starter kit, $1,090 (including the PCnet software) or $1,550 (including *Advanced NetWare/86*); PCnet network interface board, $495; Conquest multifunction board with network daughterboard, $795; 100 feet of cable, $50.
In Short: Orchid Technology's LAN is easy to install and can adapt to the needs of individual systems. The Conquest board could help those short on slot space. In addition, each Orchid network interface board comes with some useful software designed to circumvent hardware contention problems. Also, the use of Novell's *NetWare* ensures compatibility with networked applications programs. It's not the fastest network around, but it should suffice for office and light transactional processing uses.

CIRCLE 676 ON READER SERVICE CARD

Attention Lotus users: Write easier, write faster. Right in 1-2-3.

Lotus users must be the most loyal, most patient people in the world . . . so many of you continue to use 1-2-3 for writing memos and reports. You tap the /Range Justify command to rearrange text. Your [F2] edit key is worn an eighth of an inch shorter than the rest. It's not pretty, but it works. Well, your patience just paid off. Introducing 4WORD, The Add-In Word Processor™ for 1-2-3. If you've ever written a memo using Lotus, you're going to love it.



Complete Word Processing. Built-In.

4WORD is unlike anything you've seen. It's not a macro. It's not even a stand-alone Lotus add-on. 4WORD is full-featured word processing software that integrates into 1-2-3 itself. It's one of the first products available that uses the new Advanced Add-In technology from Lotus. So it actually functions as part of 1-2-3 (the way word processing works inside Symphony). That means when you want to write a memo, just shift into 4WORD with a single keystroke. Right in the middle of your spreadsheet. You never have to stop, store and exit 1-2-3 again.

Imagine: You're running a "what-if" budget analysis in 1-2-3 and you come up with a better solution. Quick, fire off a memo to your department manager before you lose your train of thought. Without 4WORD you'd have to save your spreadsheet, exit 1-2-3 and load a word processor. With 4WORD, just move the cursor to an unused column, press a key and you're there. Now you can type away. With features of the most powerful word processors.

Better letters. On-screen.

4WORD gives you automatic word wrap with on-screen justification. Block copy and move. Bold, italics, underline, global search and replace, tabs, automatic re-align, margins, and more. All right on your screen. All without leaving 1-2-3. You can even create sophisticated form letters, and merge them with the spreadsheet's database. Automatically. Then print with the 1-2-3 /Print command. And, the whole process can be controlled by a 1-2-3 macro.

Now let's talk integration. Imagine the memo again. And imagine this: To demonstrate your solution, you need to include spreadsheet numbers. Can 4WORD do that? You bet. Just tap /Integrate (that's a new 4WORD command), move the cursor across the range of numbers and zap. Your memo is connected to your spreadsheet. And the numbers appear in the memo right where you want them. If you change numbers in the spreadsheet, the memo changes too. We call this "hot links." And the first time you write a report with tables, exhibits and appendices linked to 1-2-3 spreadsheets, you'll understand why.

Specifications:

- Not copy-protected.
- Requires PC/MS-DOS 2.0 or later and an IBM PC version of Lotus 1-2-3 Release 2.0 or later.
- Compatible with EMS boards and programs like Sidekick, SQZ!,™ Note-It® and HAL.
- Uses only 50K of additional memory.
- Complete on-line, Lotus-like help system.
- Can be controlled by 1-2-3 macros.

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CIRCLE 192 ON READER SERVICE CARD

Novell provides the networking software used by many hardware manufacturers, with different versions corresponding to different microprocessors. *Advanced NetWare/86* drives servers that use the 8086/88 processor. The special *NetWare 68* is designed for servers with 68000 chips. And, under *Advanced NetWare/286*, 80286 machines can run in the protected mode, which allows highly efficient use of extended memory.

All networking software executes two primary functions: network input/output and disk management. *NetWare* handles both and offers many features besides, including electronic mail, printer spooling, and a comprehensive security system. The program replaces DOS on the server and uses special techniques not available to DOS. Large RAM buffers and a disk cache move data quickly in Novell systems.

■ *NetWare* won't allow network stations to contribute resources such as disk drives or printers to the network.

Unlike IBM's *PC Local Area Network Program*, Fox's *10-NET*, and some other networking programs, *NetWare* won't allow individual network stations to contribute resources such as local disk drives or printers to the network. *NetWare* assumes a centralized server for all disk- and file-sharing actions. All resources must be in a server, although several servers can be present on any network.

Unless the network hardware manufacturer provides a specially tailored version of the product, the installer must run a program that generates *NetWare* for the boards in use. This takes about 15 minutes, requires some disk swapping, and has to be done only once. Installing the software on the server can take 4 hours or more if a disk diagnostic program is run. Actually loading the networking software, however, takes about 10 minutes. Setting up ac-

Benchmark Tests: PCnet

The critical factor for these benchmark tests is the speed degradation that the network demonstrated under load. Despite *Advanced NetWare*'s reputation for speed, Orchid Technology's PCnet running under that software was not one of our top performers. For our evaluations, Orchid supplied Novell's *Advanced NetWare/86*, which did not use the full power of the server's 80286 processor. The system ran smoothly and with no surprising degree of degradation. The system's performance should be adequate for office and light transactional processing applications.

Network Speed Under Contention

Performance Times
(Times given in seconds)

Interface cards	Software	Server	Zero stations	One station	Two stations	Three stations	Four stations
PCnet	*Advanced NetWare/86*	8-MHz IBM PC AT	87.50	140.37	225.22	245.63	279.55
NetWare/S-Net	*Advanced NetWare 68*	Novell Server 68B	71.00	83.70	94.29	103.71	115.68
ARCnet	*Advanced NetWare/286*	8-MHz IBM PC AT	59.45	82.14	87.83	78.21	92.56

Network plus Server Cruncher

Performance Times
(Times given in seconds)

Interface cards	Software	Server	Zero stations	One station	Two stations	Three stations	Four stations
PCnet	*Advanced NetWare/86*	8-MHz IBM PC AT	67.50	140.61	241.22	308.51	358.52
NetWare/S-Net	*Advanced NetWare 68*	Novell Server 68B	71.00	73.05	79.45	86.87	91.00
ARCnet	*Advanced NetWare/286*	8-MHz IBM PC AT	59.45	65.85	73.87	110.85	128.63

Smart Applications

Performance Times
(Times given in seconds)

Interface cards	Software	Server	Zero stations	One station	Two stations	Three stations	Four stations
PCnet	*Advanced NetWare/86*	8-MHz IBM PC AT	50.00	80.00	135.00	168.00	181.00
NetWare/S-Net	*Advanced NetWare 68*	Novell Server 68B	81.00	61.00	62.00	83.00	64.00
ARCnet	*Advanced NetWare/286*	8-MHz IBM PC AT	47.00	49.50	49.50	50.50	50.50

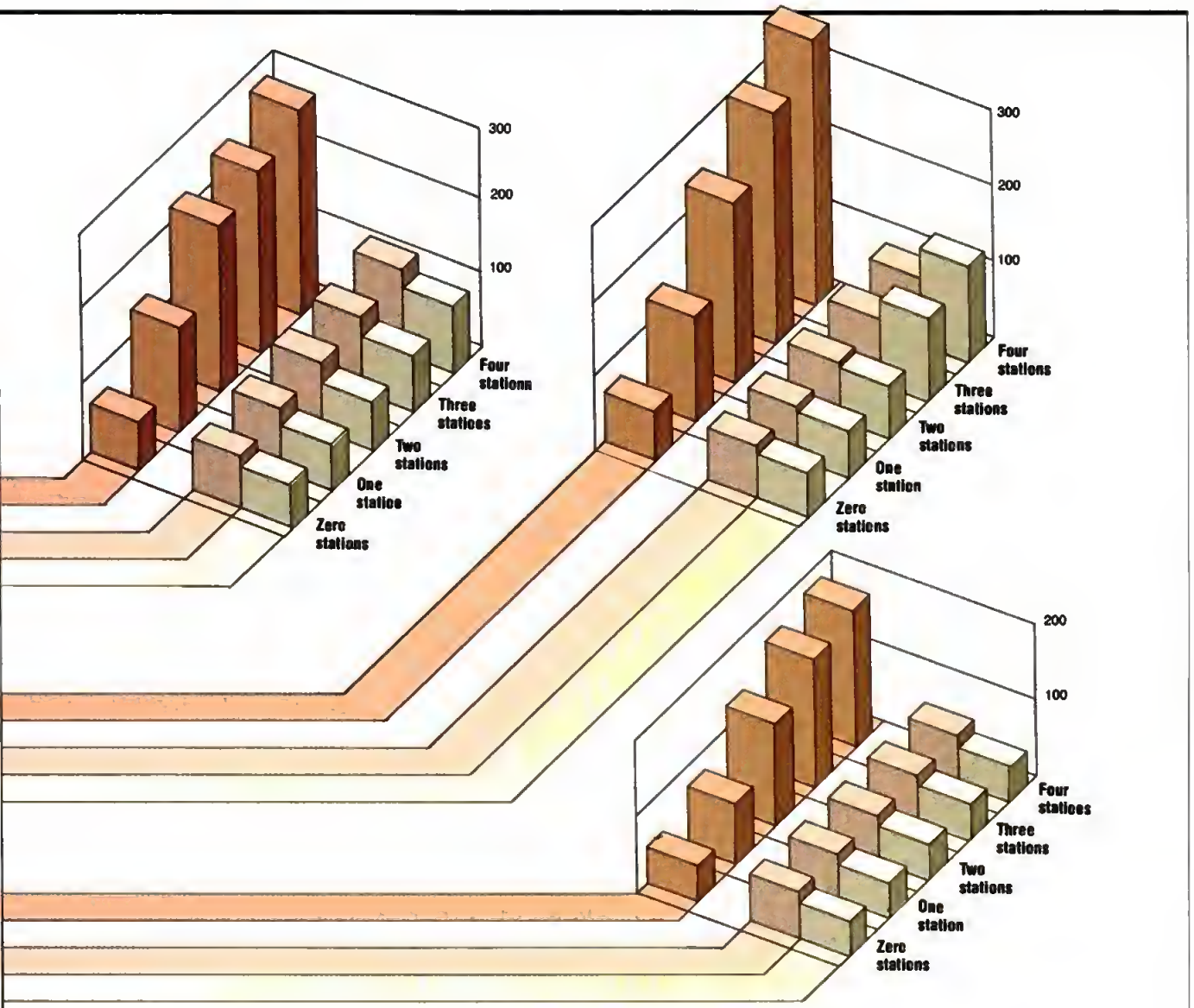
PC Labs tested Orchid Technology's PCnet, which consists of PCnet network interface cards running under Novell's *Advanced NetWare/86*, with an IBM PC AT acting as the server.

For comparison we have included the results of the benchmark tests for two products reviewed in "Making Connections: LANs Under NetWare" (*PC Magazine*, Volume 5 Number 21): Standard Microsystems' ARCnet, which received the Editor's Choice in that issue, and high performer Novell's NetWare/S-Net.

We configured all of the servers to operate only in the dedicated mode and not as dual-purpose server/workstations. The benchmark tests were run using a network of three IBM PCs, one IBM PC AT, and one IBM PC-XT as workstations. All networking software was installed using the default configurations. No attempt was made to "fine-tune" the buffers or other parameters to achieve better performance in any one test.

For both the **Network Speed Under Contention** and **Network plus Server Cruncher** benchmark tests, the dependent variable is the time it took for the IBM PC-XT on a LAN to perform a standard set of DOS read-write commands against a single data file residing in the server. The independent variable was the network load. We began with the heaviest load, four network workstations running DOS batch files, asking for constant reads of data files from the server. Then we decreased the number of workstations one by one to reduce the network load.

The three-dimensional chart shows the time it took the XT to perform the test under the varying



network load on each network. For comparison, we give the time it took to run the same tests through the network with no other active stations (Zero stations).

The difference between the Network Speed Under Contention test and the Network Plus Server Cruncher test lay in the size of the data blocks that the workstations moved over the network.

The Network Speed Under Contention test exercises the network when the network interface cards and the media are heavily loaded. We attempted to eliminate the factor of server disk access time from this test by loading the network with data blocks small enough to reside in the server's cache memory on most systems. In addition, we varied the size of the data files to detect any cache limits.

The Network plus Server Cruncher test heavily loads the network interface cards, the media, and the server's disk drive access system. In this case we used data blocks of various sizes, some small, some large, when we loaded the network in order to exercise the hard disk drive access system. The results are influenced by hard disk performance and the efficiency of the networking software as it moves data on the disk and between the disk and the network interface cards.

During both of these tests, we used a hardware clock residing on an AST SixPak card in the XT to determine the starting and ending times. We did not use the system clock because its operation can be disturbed by some network functions.

The *Smart* series of integrated networked programs from Innovative Software gave us a practical way to evaluate networks under the load of typical applications. In fact, viewed on a systems monitoring screen, such as NetWare/S-Net's, the **Smart Applications** benchmark test looks and acts like a busy office, because the level of activity varies between intense use of the network and quiet periods when processing takes place.

For the dependent variable plotted on the three-dimensional chart, we used an IBM PC-XT operating Innovative Software's *Smart DBMS* running a script file that indexed and sorted shared database records. The independent variable was one through four workstations running another script from Innovative Software that created bursts of activity interspersed with periods of silence.



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CIRCLE 394 ON READER SERVICE CARD

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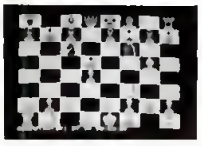
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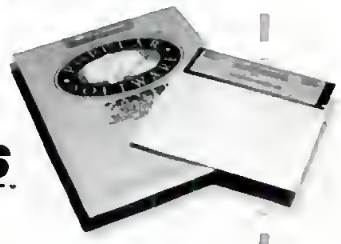
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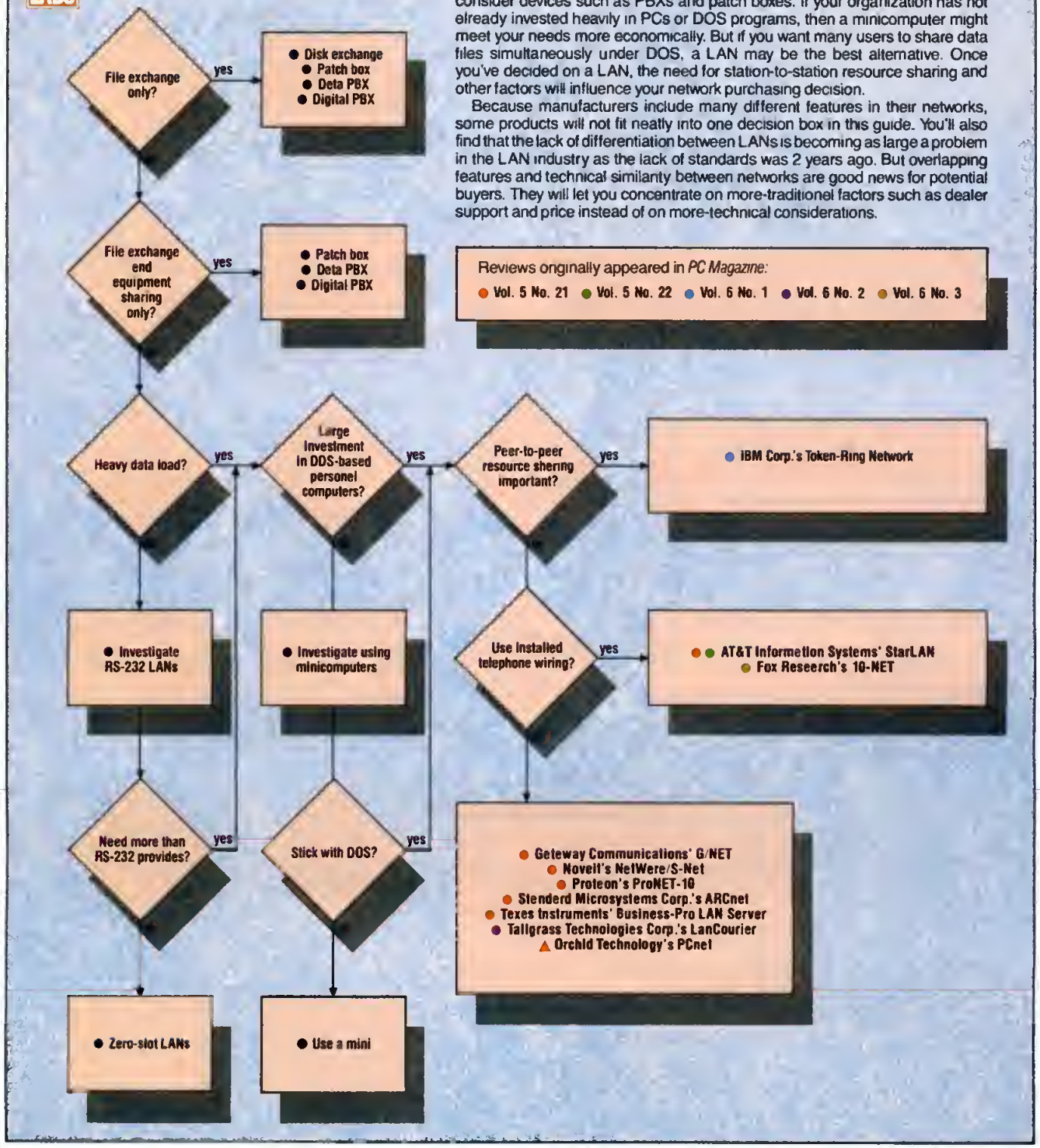
PC 2-24

CIRCLE 471 ON READER SERVICE CARD

The Connectivity Decision Guide

This chart is designed to help you select from among the many information-transfer and resource-sharing alternatives. As you can see on the chart, if all you really need to do is exchange files or share printers, then you should consider devices such as PBXs and patch boxes. If your organization has not already invested heavily in PCs or DOS programs, then a minicomputer might meet your needs more economically. But if you want many users to share data files simultaneously under DOS, a LAN may be the best alternative. Once you've decided on a LAN, the need for station-to-station resource sharing and other factors will influence your network purchasing decision.

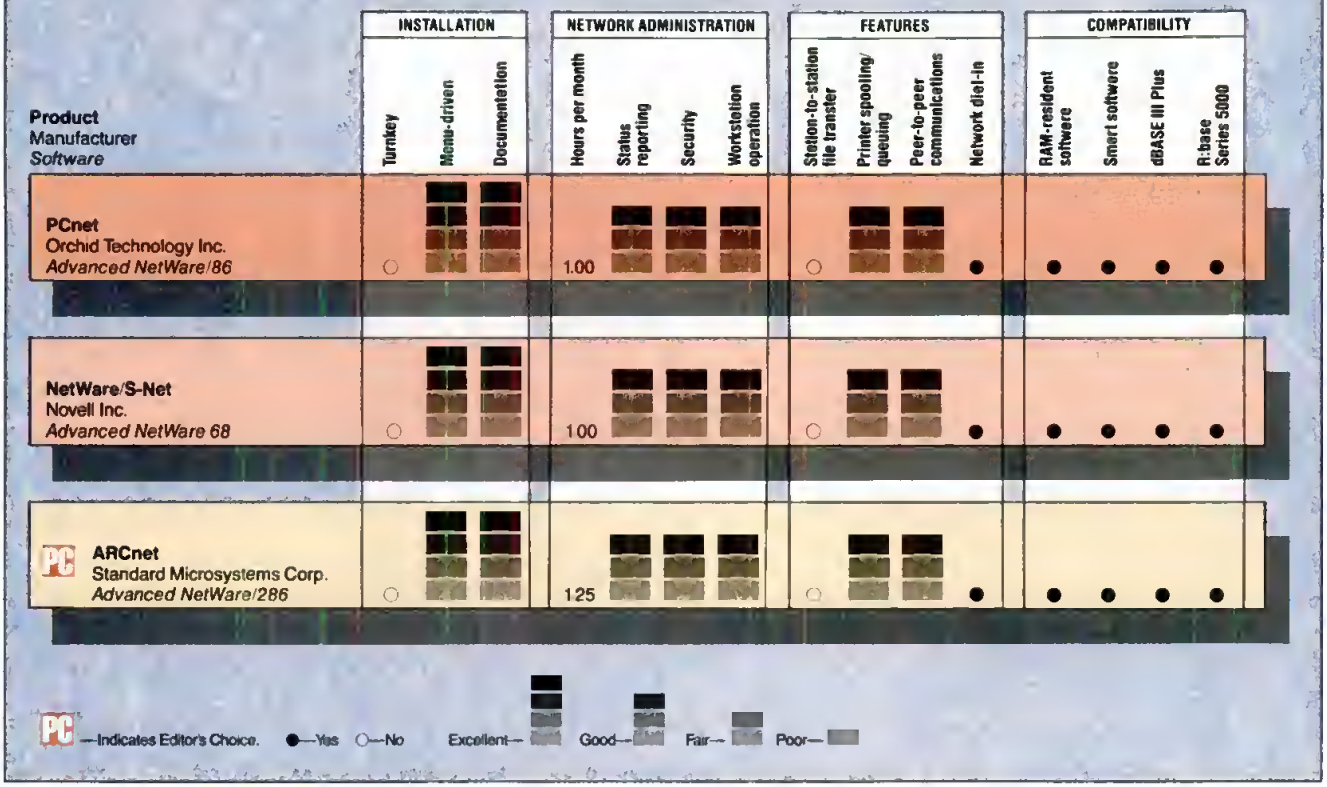
Because manufacturers include many different features in their networks, some products will not fit neatly into one decision box in this guide. You'll also find that the lack of differentiation between LANs is becoming as large a problem in the LAN industry as the lack of standards was 2 years ago. But overlapping features and technical similarity between networks are good news for potential buyers. They will let you concentrate on more-traditional factors such as dealer support and price instead of on more-technical considerations.



Reviews originally appeared in *PC Magazine*:
● Vol. 5 No. 21 ● Vol. 5 No. 22 ● Vol. 6 No. 1 ● Vol. 6 No. 2 ● Vol. 6 No. 3

PCnet: Summary of Features

The features described in this teble are determined largely by the networking software. For an in-depth description of the method we used to evaluate each feeture, see "Making Connections: LANs Under NetWare," *PC Megazine*, Volume 5 Number 21. The software feetures of Orchid Technology's PCnet are those of Novell's *Advanced NetWare*, which Orchid repackages. You need to go through several steps to install the software; while the process isn't difficult, it is time-consuming. Standard *NetWare* features include excellent menus for both the user and the system administrator, excellent documentation, and an interactive tutorial.



cess authorizations and disk mapping can take just e few minutes for an experienced *NetWare* administrator or hours for someone learing the system.

Orchid's version of *NetWare* requires you to run the full system-generation and installation programs. It is equipped with Novell's comprehensive menu system, allowing both the network administrator and network users to work through their setup and installetion in a logical and complete manner. The software documentation is divided into volumes for the network adminstrator, installer, and workstation operator. The installation alternatives concerning DMA, interrupts, and memory addresses are described in detail, although Novell's installation program actually handles these factors easily. And *NetWare*'s exemplary tutorial should simplify metters once the network is up and running.

PERFORMANCE AND PRICE PCnet's drawbacks can be summed up in one word: speed. Even with *NetWare*, the PCnet system was unimpressive in our benchmark tests—in fact, it's one of the slowest networks we've tested so far. One factor was that Orchid provided Novell's *Advanced NetWare/86* instead of *Advanced NetWare/286*, the version designed for the 80286 chip. If you install one of these systems with an AT or equivalent as a server, be sure to get the 286 version; its ability to run the AT's processor in the protected mode means a lot to performance.

If the speed doesn't attract you, the price might. A two-user starter kit, with two standard PCnet boards, cable, resistors, and *Advanced NetWare/86* lists for $1,550. PCnet interface boards cost $495 apiece, well below the price of most boards we've seen, while the feature-rich Conquest (including a PCnet daughterboard) will set you back $795.

Overall, *PC Magazine*'s Editors' Choice remains Standard Microsystems' ARCnet hardware running under Novell's *Advanced NetWare/86* because it is fast and resists degradation in heavily loaded environments.

Frank J. Derfler, Jr., is a contributing editor of PC Magazine.

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CIRCLE 322 ON READER SERVICE CARD

EPSON DOES IT AGAIN

With the Equity I, Epson America found a magic formula for success in the tough PC-compatible market. The clever blending of low price, dealer support, excellent compatibility, and its well-known brand name won the $995 machine a place as a sales leader among the multitude of 8088-based computers. Upon introducing the Equity II, the company expanded on its sure-fire formula by spicing up an otherwise ordinary XT compatible with the peppier performance of a NEC V30 microprocessor.

Capitalizing on the fame and formula of the Equity I and II, Epson also developed its own AT compatible, the Equity III, using exactly the same ingredients for success. Although it proved to be a good, solid machine, something was lacking from its recipe. A near-duplicate of the IBM PC AT, the Equity III lacked real excitement—but not for long. By cutting several hundred dollars from the Equity III's price and a couple of inches from its width and adding more performance—and in the process, totally redesigning the machine—Epson created the Equity III Plus.

At $2,695, priced $600 less than the previous model and $1,300 below IBM's base-model AT, the Equity III Plus generates its own excitement at a 10-MHz rate. Add another $1,200 to the price, and you

The Equity III Plus is a worthy alternative to IBM's PC AT with the winning Epson America formula: familiar brand name, competitive price, sturdy construction, and above-average performance.

Benchmark Tests: Epson Equity III Plus vs. IBM PC AT

Running at 8-MHz clock speed, the Epson Equity III Plus matches or beats the IBM PC AT's performance on critical memory, processor, and disk speed tests, making it a hearty AT competitor. With its three clock speeds and one-wait-state technology, the Equity III Plus offers power and upgrade flexibility in a tight, affordable package.

The **NOP** benchmark test is designed to measure raw clock speed and memory access time while minimizing differences in microprocessors and the effect of memory caching. This test executes almost nothing but NOP ("No Operation") machine code instructions in a big 128K loop.

The **8086 Instruction Mix** benchmark test measures the time it takes to execute a selected series of processor-intensive tasks. The test program uses 8086 instruction code. These instructions are a subset of the total processor instruction set.

The **Conventional Memory** benchmark test allocates 256K bytes of conventional memory and treats it as a series of 64-byte records. Then, 16,384 random records are read into and written from this memory. The result shown is the average of the read and write times.

The **Floating-Point Calculation** benchmark test measures processor speed by looping through a series of floating-point calculations, including multiplication, division, exponentiation, and logarithmic and trigonometric functions. The benchmark program uses the floating-point library included with Microsoft C Compiler 4.0.

The **BIOS Disk Seek** benchmark test measures the time it takes to do a random seek using the disk's ROM BIOS. The test result includes minimal software overhead and may not parallel the manufacturer's claimed average access time. The test program performs 1,000 seeks. The average result is shown in milliseconds.

Performance Times
(Times given in seconds except where noted)

Product	NOP	8086 Instruction Mix	Conventional Memory	Floating-Point Calculation	BIOS Disk Seek (milliseconds)
IBM PC AT (8 MHz)	4.20	9.00	1.30	36.00	37.00
Epson Equity III Plus (6 MHz)	5.60	12.25	1.76	48.06	32.46
Epson Equity III Plus (8 MHz)	4.17	8.90	1.30	35.48	32.46
Epson Equity III Plus (10 MHz)	3.35	7.14	1.02	28.01	32.46

get an enhanced model equipped with a high-performance hard disk that makes the best of IBM's options look geriatric.

Sold through dealers, the Equity III Plus also promises the security of nearby support and hand-holding for neophyte users. It's compatible with just about any program that will run under PC-DOS. And, of course, the Equity III Plus prominently bears the Epson name—a household word in homes decked out with PCs.

Compared with its predecessor, the Equity III, the Equity III Plus is a bed of innovation. It's built of new, Epson-developed very large scale integration (VLSI) circuitry with a novel, space-saving board layout and several clever convenience features that should give other manufacturers new ideas to think about. Although not the fastest AT-compatible computer on the market, the Equity III Plus outperforms IBM's best by almost 25 percent. Moreover, it has no glaring flaws or shortfalls. With the winning Epson formula—familiar brand name, competitive price, sturdy construction, and above-average performance, it's a worthy alternative to the IBM PC AT.

■ The Equity III Plus outperforms IBM's best by almost 25 percent.

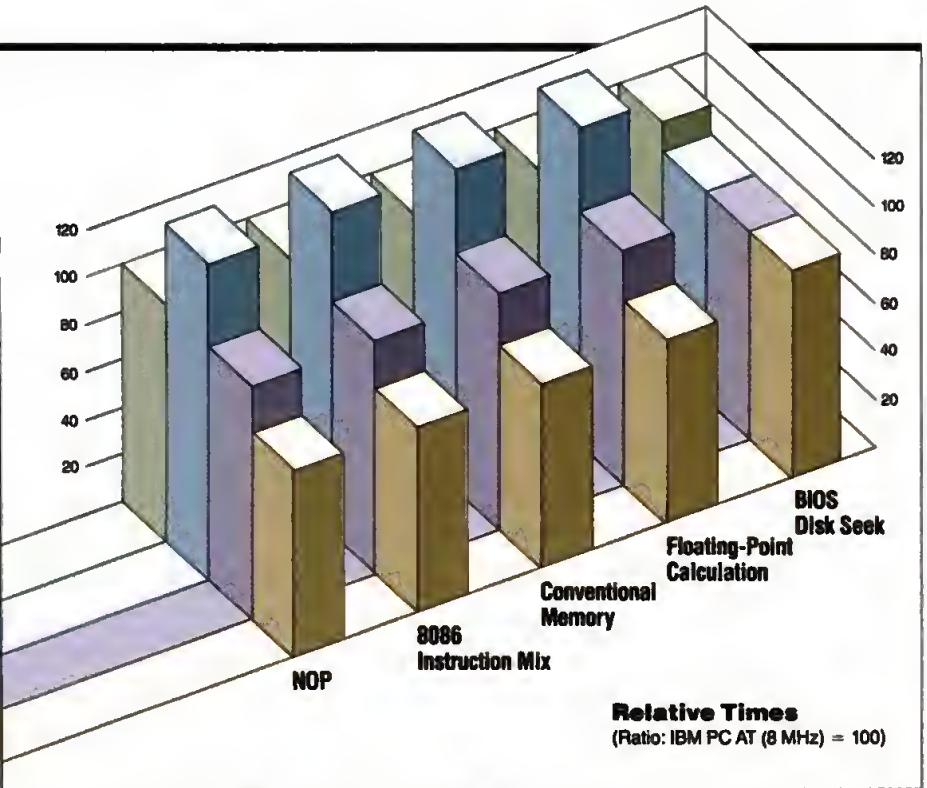
A NEW STYLE Although functionally identical to the IBM AT except for performance, the Equity III system unit differs both in styling and construction. The off-white Equity III shell is formed from textured, painted, stamped steel and is decorated with a plastic front panel.

Because of a new twist in the design of the internal hard disk slot, the Equity III Plus is just under 3 inches narrower than an IBM AT. Ordinarily that would make the tall, AT-height chassis look even taller, but, to cut things down to size and tame the towering appearance, Epson's industrial stylists elected to split the front panel into thirds, matching each to one of the three half-height drive slots that stick through it. The demarcation between each third is perforated to provide ventilation through to the system. The effect is to reduce the overall bulky look of the machine so that it appears more like three small chassis stacked atop one another.

Epson forgoes the IBM-style miniature control panel and mounts the system lock and LED indicators on the front panel. The cylindrical key lock, which turns off the keyboard and mechanically locks the case, is located in the middle left of the Equity III Plus front panel. The two requisite indicators—power-on and hard disk activity—peek through the front panel between the lock and the middle floppy disk slot.

On the lower left side of the front panel, Epson has installed two hinged plastic doors. The leftmost and narrower of the two swings down to reveal the keyboard jack. A small notch in the left edge of the front bezel allows the cable to sneak out with the front door closed, and a hinged plastic tab on the right angle connector that plugs into the jack makes unplugging the keyboard easy.

Although the hiding place is clever and eliminates the need to snake an unruly coiled cable around the system unit, it misses perfection by not matching the keyboard, which has its cable jack on its right rear edge. Putting the cable connectors on



the same side of both the system unit and the keyboard would help prevent cable snarls from shifting and shuffling anything you place on your desktop that inadvertently gets caught between the computer and its keys.

A second, longer hinged door to the right of the first hides a small set of controls that includes a volume control for the system unit speaker, the monitor selector switch, a three-position microprocessor clock speed selector, and a system reset (boot) button. The only other user control is an AT-style paddle on/off switch near the rear of the right side of the system unit.

Unlike the earlier Equity III, which went completely in its own direction for chassis design, the Equity III Plus runs the middle ground between the Equity III and the conventional IBM AT chassis layout. The top cover and front panel form a single unit, which is attached to the chassis at the rear by five screws. The top slides forward and off for access to the electronics, drives, and expansion slots.

Like the IBM AT, the Equity III Plus offers five half-height disk drive bays (the earlier Equity III had only four). Unlike the AT, the entire stack of three on the far right side of the system unit open through the front panel. Because of small, ledge-like shelves designed to help support the drives at each side of these drive bays, you may encounter some difficulty installing a full-height device in these bays.

The other two half-height bays are completely internal, dedicated to hard disk drives. To save space and shrink the Equity III Plus footprint, these internal bays run perpendicular to the others: disk drives mount in them edgewise.

Unlike the mounting rails used in the IBM PC AT and most compatibles, drives are fastened inside the Equity III Plus with screws, much the same way that they are mounted in an ordinary PC. Although screws can be attached to only one side of the floppy disk drives, the mounting scheme seems quite secure.

SEGMENTED SYSTEM The biggest change between the Equity III and the Equity III Plus was a total redesign of the system board. The system board in the older machine only allowed four drive bays because of its size: it filled nearly the entire floor of the machine's chassis.

In shortening the Equity III Plus, the inches didn't come easily. The entire system board had to be redesigned and reduced in size. To achieve that end, Epson developed its own AT chip set, which is similar to the Chips and Technologies set that most other clones are based on. Most of the discrete components used in the AT design are condensed into four large chips.

In addition, all the discrete functions of the Equity III system board have been separated and the board itself broken into four distinct parts in the Equity III Plus. One central board, about 6 by 8 inches, contains the thinking part of the system, a Siemens 80286 microprocessor, its support logic, and a socket for an 80287 numeric coprocessor. Interestingly, this card can be removed and reinserted into the Equity III Plus by sliding it through the front panel—all without removing any expansion cards.

The potential of putting the microprocessor on a separate board and using this mounting scheme is intriguing. In a couple of minutes, the basic thinking engine of the Equity III Plus can be swapped out for repairs or replacement—or perhaps for upgrading to a new, even more exciting microprocessor (say an 80386). If Epson opts for supplying such upgrades as newer technologies become available, the Equity III Plus can remain state of the art while its competition becomes obsolete.

(Of course, no PC supplier has yet offered system upgrades, or even replacement motherboards, to modernize earlier computer models. Selling entire comput-

PC MAGAZINE FACT FILE

Epson Equity III Plus
Epson America Inc.
Computer Products Division
2780 Lomita Blvd.
Torrance, CA 90505
(213) 539-9140
List Price: Base model, $2,695; with 40-Mbyte drive, $3,895. Monitor or adapter card are not included.
In Short: A three-speed (6-, 8-, and 10-MHz, all with one wait state) AT compatible with 640K RAM, a serial port, a parallel port, and a hard disk drive controller as standard equipment. Excellent flexibility and interesting upgrade possibilities. It's priced aggressively.

CIRCLE 650 ON READER SERVICE CARD.

ers is more profitable than selling upgrades alone.)

The Equity III Plus microprocessor operates at 6, 8, or 10 MHz with one wait state, selected either by the front-panel slide switch or through a software command. However, you must be careful. Throwing the front-panel switch will reboot the system and destroy anything you might have been working on. Epson promises to fix this problem in future models, but this means the software speed-change operation will be discontinued.

Epson offers a jumper-selectable option for the operating speed of the numeric coprocessor. From the factory, the Equity III Plus is set always to run the 80287 at an 8-MHz clock rate. Moving a jumper forces the coprocessor to operate at two-thirds the microprocessor clock speed, that is, 4 MHz, when the system clock runs at 6 MHz or 6.67 MHz at top speed. Obviously, the factory setting gives the highest performance; the alternate setting allows you to get away with buying a slower (hence cheaper) coprocessor.

Another jumper (which is actually not on the system board) helps make the Equity III Plus uniquely hardware compatible by allowing you to select the number of wait states inserted in the input/output cycles—that is, when expansion cards are accessed. The choice is between one or two wait states, the latter permitting slower expansion cards to be used with the system running at its highest speed.

CHANGEABLE MEMORIES A separate board, which plugs in perpendicular to the processor board and closely conforms to the side of the disk drive bays, holds all of the system memory, both RAM and ROM. Standard memory is the DOS maximum of 640K bytes, based on a single parity-checked bank of 18 256K-bit dynamic random access memory (DRAM) chips, several wide-bus (64K-bit by 4-bit) chips, and two ordinary 64K-bit chips for parity checking. In addition to the two Epson ROM BIOS chips, two sockets are provided for expansion ROM, as in the IBM AT.

With suitable expansion cards, the Equity III Plus system memory can be pushed all the way up to the 16-megabyte addressing limit of the 80286 microprocessor.

Several jumpers on the memory card allow a great deal of flexibility and customization. One jumper allows you to select which of the two pairs of ROM sockets is active—you can install two different BIOS sets and switch between them (changing the entire personality of the machine) merely by changing a single jumper.

Other jumpers permit you to defeat sections of the built-in memory—for instance, to operate a Lotus/Intel/Microsoft expanded memory specification (EMS) board or an AST/Quadram/Ashton-Tate

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enhanced EMS memory board (which operates optimally with only 256K bytes of conventional memory). Alternatively, the entire on-board memory endowment may be turned off.

Another separate circuit card is used for the expansion bus, lining the rear of the chassis. Nine expansion connectors are included: three with the XT-style 8-bit bus and six with the full 16-bit AT bus. All expansion slots run the full depth of the chassis, and, unlike some computers with extra expansion slots, all nine slots of the Equity III Plus are associated with openings in the rear panel for mounting brackets.

In all models of the Equity III Plus, one of the 8-bit slots is filled with the remaining system-board functions, a multifunction card that contains the system floppy disk drive controller and ports. (All of these multifunctions were built into the older Equity III system board.)

One serial port, which uses an AT-style male DB-9 connector, and one parallel port, which uses a female DB-25 connector, are provided. Jumpers permit assigning the serial port as COM1 or COM2 and the parallel port as LPT1, LPT2, or LPT3. Alternatively, the ports can be switched off. (As with all PC systems, the exact port assignment that you get depends on the other expansion options you have installed).

DRIVE OPTIONS The floppy disk drive controller can handle two drives, and the cabling for a second drive is included. Support for 3½-inch floppy disk drives is built into its circuitry, though Epson doesn't manufacture its own yet.

The 8-bit connection to this multifunction card somewhat limits the speed at which data can be transferred to the microprocessor. However, little penalty is actually imposed because the ports operate only as 8-bit devices, and the floppy disk drive is much slower than the system, anyhow.

Even in Equity III Plus models sold without hard disk drives, the rightmost 16-bit expansion socket is occupied by a dedicated hard disk drive controller. (A hard disk drive controller was *not* standard equipment on the earlier Equity III.) This controller can also operate up to two drives, and cabling for both is supplied.

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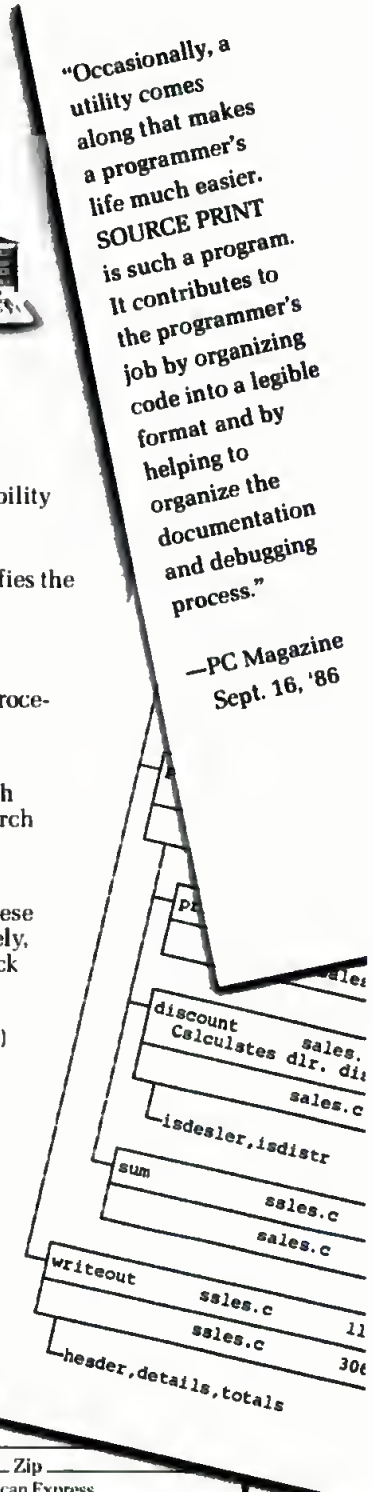
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■ EPSON EQUITY III PLUS



The streamlined Epson Equity III Plus is three inches narrower than the IBM PC AT. The front panel holds bays for three half-height devices. Two small doors on the lower left conceal the keyboard jock ond a set of controls that includes a volume control, the monitor selector switch, a three-position clock speed switch, and a system reset button. The 101-key keyboard closely matches the new IBM enhanced configurotion with separote cursor control keys.

The standard disk equipment in all Equity III Plus machines includes a single high-density (1.2-megabyte) floppy disk drive. The system received for review was equipped with a Canon unit. Optional disk drives include additional high-density units, ordinary double sided, double density (360K capacity) drives, and the newer 3½-inch drives (which are not yet available as an Epson product).

Epson's choice for the optional hard disk drive is a high-performance, full-height 40-megabyte Miniscribe. Based on an advanced servo-voice coil actuator, it delivers an average access time of about 33 milliseconds on PC Labs benchmark tests (it's rated at 28 milliseconds) and uses the standard ST-506 interface and modified frequency modulation (MFM) data coding for a data transfer rate of 5 MHz. As per IBM's choice for the AT, the Epson hard disk is formatted with a sector interleave of

3. The Miniscribe disk automatically parks its head when system power is turned off.

As a $1,200 option, the Miniscribe disk is a reasonable buy for a factory-installed hard disk. However, you could save a few hundred dollars by adding a hard disk yourself. Installation and setup requires about the same effort as the work on an IBM PC AT.

Perhaps the least convenient feature of the redesign of the Equity III Plus is the battery it uses to keep its CMOS memory alive when the power is off. The older Equity III attached the battery to its rear panel with Velcro. Although a proprietary arrangement of the power connector to this battery probably limited your choice of supply for replacement batteries to one—Epson—you could at least replace the battery yourself. In the current Equity III Plus, the 6-volt lithium battery is semipermanently fastened to the central system board. Replacing it will require more surgery than you might want to deal with. Wandering back to your dealer or service center to replace a battery—even if it must be done only every 3 years or so—is a waste of time. According to Epson, the company isn't going to address this problem in the foreseeable future.

In the sound and music department, Epson is generous, mounting a big, 3-inch speaker against the front of the Equity III chassis. At the right rear corner of the chassis is hefty switching power supply capable of furnishing 200 watts.

SPRINGY KEYS Epson supplies its own 101-key keyboard with the Equity III Plus. Its layout closely matches the new IBM enhanced keyboard, including enlarged Enter and Shift keys, separate cursor control pad, 12 top-row function keys, Esc at the upper left, and indicators for locking Shift keys at the upper right. The styling of the keyboard is a little squarer than IBM's choice and has more angles. Two stiffly locking feet allow you to adjust the typing slope to either 5 or 15 degrees.

The feel of the Epson keyboard is definitely inferior to that of the IBM product or even to that of some of the better clone keyboards. The keys require a somewhat greater force to activate them than those on the IBM keyboard, and the feel is progressive but springy, without much tactile

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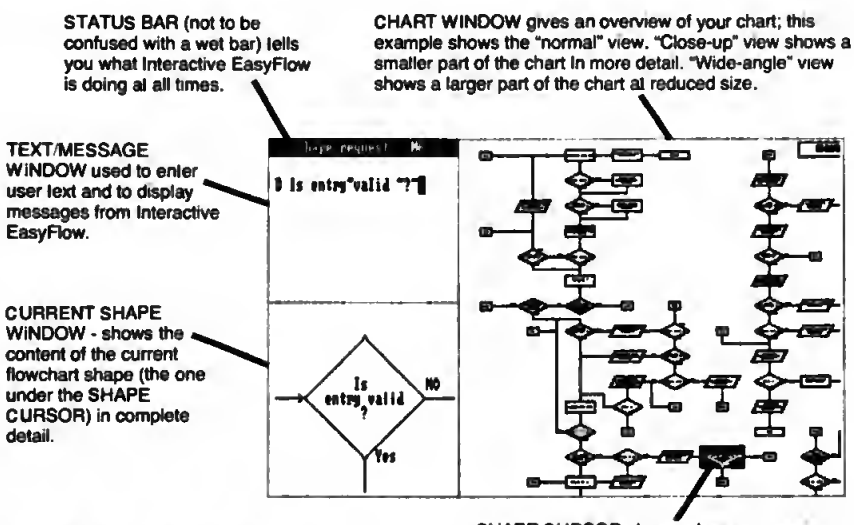
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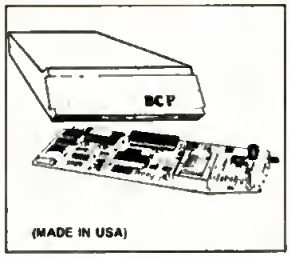
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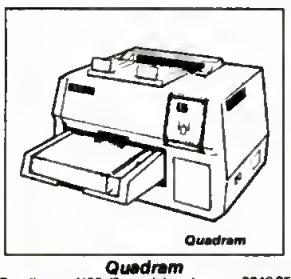
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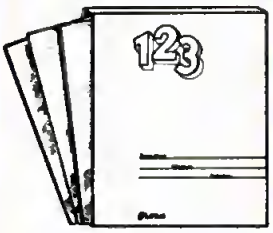
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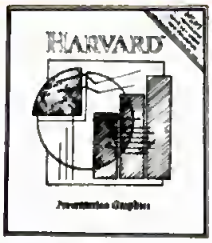


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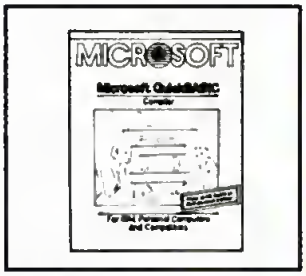
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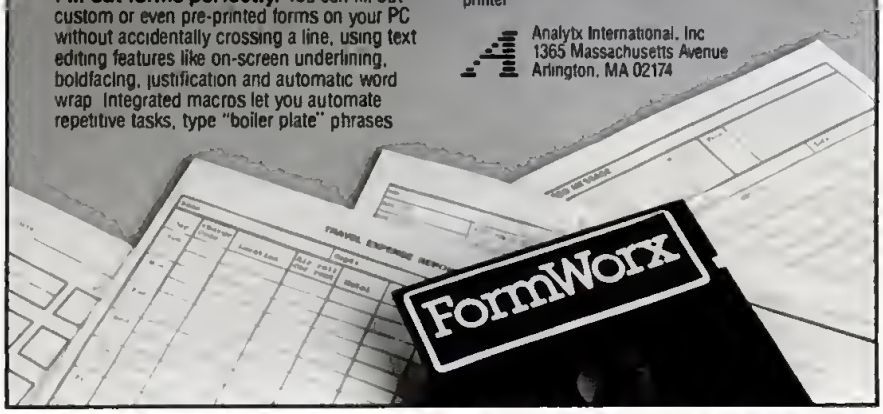
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■ EPSON EQUITY III PLUS

feedback and no audible feedback except when the keys bottom out at the ends of their travel.

The keytops are lightly textured, though somewhat slippery. The Spacebar seems to require more force to operate than the rest of the keys, and its top surface is angled so that its front edge wears against the typist's thumb. Although those who hunt and peck through spreadsheets may not notice the oddly angled Spacebar, people who do word processing all day long may find its front edge irritating.

The keyboard uses hard-contact technology with a separate switch module for each key. Although hard-contact keyboards are generally held to be shorter-lived than the capacitive style used by IBM and many compatibles, the modular switch design of the Equity III Plus allows keys to be individually repaired—an option not available with the IBM. Although not as finger-pleasing as the IBM, the Equity III Plus keyboard is neither unworkable nor unlikeable. It's just that the IBM standard is very high and hard to beat—even match.

All display systems are options with the Equity III Plus. The review unit was supplied without a monitor or an adapter card.

NEW TRICKS FOR AN OLD DOS MS-DOS is such a common and necessary element for today's IBM-compatible computers that even mentioning the operating system seems almost trivial. Epson, however, has added enough new features to the old DOS to give the operating system an entirely new look and increased convenience—particularly for new PC owners—all without sacrificing compatibility.

The most commendable design choice made by Epson was including MS-DOS 3.2 (with built-in 3½-inch floppy disk support) as a standard feature. While many industry leaders still believe that an operating system should be an extra-cost option, Epson seems more on the right track.

The MS-DOS 3.2 supplied with the Equity III Plus has been enhanced over the ordinary, general-distribution product by the addition of several new utilities. The added programs all address the most criticized aspects of unadorned DOS.

The biggest complaint that new users of DOS have is that it's just plain incompre-

■ EPSON EQUITY III PLUS

hensible. Although DOS can do nearly anything, it's up to you to figure out how to do it. The standard DOS interface—the ubiquitous and ominous A> prompt—gives you no choice but to learn and memorize commands that are often far from obvious. Add a hard disk and subdirectory system, and it's like orienteering in no-man's land without a map, a compass, or a mossy tree.

Epson addresses the user-interface problem by including *X-Tree*, a file manager, and its all-around useful DOS front end, with the operating system. *X-Tree* will help you find out where you are when you get lost in your subdirectory tree. It will also handle most file manipulations, including such tasks as tagging files for copying and erasing in bulk and poring through subdirectories.

DU, another Epson addition to DOS that's focused primarily on making disk management easier, adds a menu-driven front end and default settings to four of the most commonly used (and often most confusing) disk-oriented operations: CHKDSK, DISKCOPY, DISKCOMP, and FORMAT. The program itself is just the menu interface and requires the normal DOS utilities to function.

Perhaps the most common program listings in magazine articles and on bulletin boards are those that purport to give you direct control over the myriad features packed into the typical cheap (read Epson) dot matrix printer. With the DOS that accompanies the Equity III (and Equity II) Epson includes its own printer utility, SetPrint, which gives you menu-driven control to turn on and off the following printer features (if you have an Epson printer or one compatible with its command set): condensed, expanded, emphasized, italic and elite modes and fonts, proportional spacing, unidirectional printing, double-striking characters, and skipping over perforations. The menu also permits sending form-feeds and carriage returns to the printer.

A similar program, SetMode, enhances the function of the standard DOS MODE utility.

In addition, Epson's version of DOS also contains the normal functions and utilities, as well as a GW-BASIC. Unlike the IBM AT, which puts part of the BASIC in-

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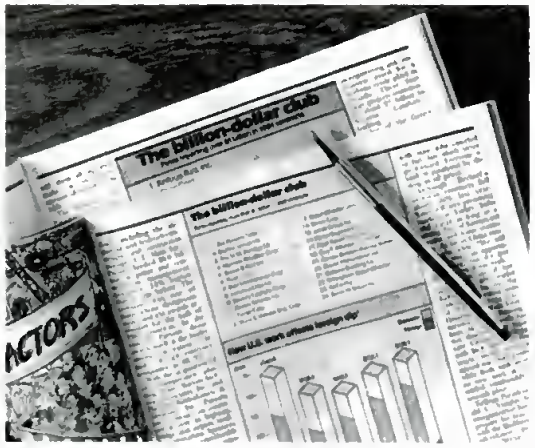


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Source: ENR Construction Economics Dept., *Engineering News-Record.* Issue dates: April 18, 1985 and April 17, 1986

CIRCLE 187 ON READER SERVICE CARD

■ EPSON EQUITY III PLUS

terpreter into the ROM of the machine, Epson's entire BASIC program is on-disk.

Documentation for the Equity III Plus is held in two IBM-size loose-leaf binders that share a common slipcase. One manual covers system setup and operation and includes a DOS reference manual. The other is a BASIC manual.

The documentation is unusually clear—particularly for a Japanese-made computer. The level of guidance is more than adequate for the greenest novice.

System setup—choosing disk drive type, confirming memory allotment, and setting system time and data—involves running a program much like IBM's SETUP. Epson's version, however, is more elaborate than IBM's and makes reconfiguring the system somewhat easier.

From that point on, operation is identical to any of the millions of DOS-compatible computers. The ROM BIOS of the Equity III Plus, which bears a 1986 Seiko Epson Corp. copyright (the original Equity III used a 1985 Kyocera BIOS), is up to all industry compatibility standards and exhibited no problems with any commercial software tested with it.

The redesign of the Equity III could hardly have been an afterthought. Creating the VLSI chips that condensed both the cabinet and price of the Equity III Plus was not an overnight project. The Equity III must have been little more than an interim design, aimed at filling the gaps in the Epson product line.

All in all, the Equity III Plus is a vast improvement over its predecessor, which rated merely as an ordinary AT compatible and lacked even the benefit of an aggressive retail price. The new power and flexibility of the Equity III Plus, its intriguing upgradeability, and its favorable pricing put it among the front-runners as an AT-compatible purchase choice.

But the Equity III Plus is much more than just another good AT compatible. It's a trend-setting and competitive computer with an excellent future. It contains all the ingredients of Epson's formula success and offers the same favorable combination of price and performance as its wildly successful original namesake. PC

Winn L. Rosch is a contributing editor of PC Magazine.

PC MAGAZINE PRODUCTIVITY

■ **PC LAB NOTES:** A DOS TUTORIAL ■ ETHAN WINER

DIGGING DEEPER INTO DOS, PART 1

By learning about and using some of the less familiar DOS commands and options, you can increase your PC productivity to power user proportions.

Most *PC Magazine* readers are "power users of *1-2-3*" or "power users of *dBASE III Plus*,"—or of any number of applications programs. On the other hand, some readers' knowledge of DOS itself is often limited to the most familiar forms of its most familiar commands. Everyone, for example, knows how to copy a file. How many readers know how to use COPY to update a file's time/date listing in a directory?

In Part 1 of this article, I'll try to go beyond the basic DOS commands to discuss their useful, but often ignored options. In Part 2 I'll also take up the new features that have been introduced with DOS Version 3. The emphasis here will be more on the what and why; the manual explains the how, even if Microsoft hadn't the sense to tell people how to use the DIR command before making an excursus into "Redirection of Standard Input and Output."

COMMAND SWITCHES: COPY DOS *switches* are the assorted "slash" options that you can add after a command word—like the /W and /P you can tack onto DIR to have it put more filenames on the display and to pause at the end of each screenful. Many other DOS commands have optional switches as well, COPY being one of the most frequently used.

Normally when you COPY a file, DOS merely transfers the program or data and assumes that it arrived intact [*something many AT owners out there will tell you does not always happen when copying from a regular 360K floppy read in drive A:—Ed.*]. By adding a /V switch at the end of the COPY command line, as in

```
COPY A:filename B:/V
```

you tell DOS not only to copy the file, but to then read it back again and compare it with the original. Of course, this additional verification pass takes extra time (about 30 percent longer), but when your data is really important, that's cheap insurance.

The two other COPY switches are /A and /B, which stand for ASCII and binary, respectively. Their purpose is to allow you to override the assumptions DOS makes about the nature of the files it handles. Suppose, for example, that you wanted to look at the error messages, copyright notice, or the like in a .COM file. If you were simply to enter the command

```
TYPE PROGRAM.COM
```

DOS would stop displaying the file as soon as it encountered the number 1Ah (decimal 26, or Ctrl-Z). That's because this particular byte is used to mark the end of a text file, and DOS assumes that ASCII, not binary, files are the kind of files that people want to TYPE. So instead, you might be tempted to try

```
COPY PROGRAM.COM CON:
```

Again, no luck. In general, DOS considers anything sent to the screen (or printer) as text, and stops at the first 26 it finds. But since .COM files are filled mostly with the numbers that constitute a program, rather than with letters, words, or names, a 26 is as likely to occur as any other number.

But if you instead use

```
COPY PROGRAM.COM/B CON:
```

you'll force DOS to treat the file as binary information and thereby to ignore any possible end-of-file markers. The /A option does exactly the opposite: it tells DOS to treat the file (whatever its type) as an ASCII file and thus to stop copying at the first Ctrl-Z. As a rule, of course, DOS makes the right assumptions automatically—you certainly do *not* need to add /B in order to copy binary files to other disks, for example. But the /A and /B switches give you overriding control when you want it.

CONCATENATING An additional COPY option lets you concatenate files as you copy them. The command

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■ PC LAB NOTES

```
COPY DOC.1 + DOC.2 DOC.3
```

copies the first file to a new file named DOC.3 and appends DOC.2 to it. This is useful for combining documents if your word processor doesn't have a merge command or if you want to use wildcards instead of typing each filename separately.

Because of the way DOS handles the Ctrl-Z marker when concatenating, you can append a file to another without creating a third. If you enter

```
COPY DOC.1 + DOC.2
```

without a new filename, DOC.2 is simply tacked onto the end of DOC.1. DOS does this by *removing* the original Ctrl-Z at the end of DOC.1, which would otherwise stop subsequent reading of the combined file in the middle.

DIRECTORY UPDATING If you simply copy a file, its time and date of creation remain unchanged in directory listings. When you concatenate files, however, the current time/date are given to the *result* file. This gives you the chance to force DOS to update the listing of a file that is, in fact, unchanged. If you enter

```
COPY filename + ,,
```

you fool DOS into thinking a file concatenation is being performed. Consequently, the current date and time are applied. But since no more names appear after the plus sign (the two commas take the place of a filename), DOS still creates the new file, though with nothing appended to it.

AVOIDING TROUBLE Two warnings about using the redating trick are in order. First, if you're redating a binary file, you must *be sure to include the /B switch*. Otherwise, the updated file will be truncated at the first occurence of a 26. If you don't have a backup, the file will be lost for good.

Second, you can't redate more than one file at a time using this technique. If you were to enter

```
COPY C:*.*+ ,, C:
```

instead of giving each individual file in the directory a current time and date, all the files in the directory would be concatenated into one giant file whose name would be the filename COPY started with.

There is one additional danger to avoid when concatenating files with COPY, especially when using wildcards, and DOS gives you no warning about it (though the manual does). If you want to put all your .DOC files together, as in

```
COPY *.DOC ALL.DOC
```

you must make sure that you do not already have a file named ALL.DOC. If you do, you'll lose its contents in the concatenating process *unless* you specifically enter that filename first and separately. Thus, in the example above, if you already have a file named ALL.DOC and you want to use ALL.DOC as the name of the destination, combined file, you must enter it in the following manner:

```
COPY ALL.DOC + *.DOC
```

INPUT OF YOUR OWN An additional measure of flexibility in concatenating files is provided by the fact that since the PC allows copying freely between files and devices, you can include text typed at the keyboard, thus:

```
COPY FILE1+CON:+FILE2 FILE3
```

■ In concatenating files, since the PC allows copying freely between files and devices, you can include text typed at the keyboard.

THE SIZE OF DOS (MY, HOW YOU'VE GROWN!)

As DOS has evolved to include more features, its size has grown significantly, too. Where DOS 1.1 requires only 13K bytes of disk space (and occupies about 12K of memory), DOS 3.2 takes a whopping 69K bytes of space on a disk and steals nearly 45K of system memory. The table below shows the disk/memory requirements of the different versions of DOS. The disk space listed includes the two hidden files IBMBIO and IBMDOS as well as COMMAND.COM, and the memory taken was determined by using CHKDSK.

DOS Version	Disk space (bytes)	Memory (bytes)
1.1	13,279	12,400
2.0	39,424	24,800
2.1	39,552	24,800
3.0	58,926	37,024
3.1	60,534	37,040
3.2	68,637	44,704

Most of the additional disk and memory space occupied by the newer DOS versions is for features such as networking and support for additional disk formats. If you do not use any of these new features, you might be tempted to stick with DOS 2.1—and forgo the constant upgrade path. In my opinion, you'd be making the right choice.

Though reports of minor bugs in DOS 2.1 still occasionally surface, it is essentially a stable and trouble-free product. I have been using 2.1 since it came out and have never experienced any problems. This includes using numerous commercial programs and doing lots of DOS tricks, as well as program development in a variety of languages. Unless you are using a high-capacity drive in an AT, the new 3½-inch type, or are operating a network, why give up the memory?

True, DOS 3 comes with some new and useful commands (to be discussed in Part 2), but unless you're a real "power user," you probably have little need for many of them. Further, equivalent (and often better) programs are readily available either in *The Norton Utilities* or from the Programming/Utilities column in this magazine.—**Ethan Winer**

Fragmentation Fighters

Orderly file assignments happen with these hard disk sector-organizing programs.

Disk Optimizer
SoftLogic Solutions Inc.
530 Chestnut St.
Manchester, NH 03101
(800) 272-9900
List Price: $49.95
Requires: 64K RAM, DOS 2.0 or later.
In Short: Moves files on a hard disk to eliminate fragmentation. Also includes data security and sector reading programs. Copy protected.
CIRCLE **653** ON READER SERVICE CARD

H.D. Tuneup
SofCap Inc.
P.O. Box 131
Cedar Knolls, NJ 07927
(201) 386-5876
List Price: $39.95
Requires: 196K RAM. DOS 2.0 or later.
In Short: Moves files on a hard or floppy disk to eliminate fragmentation. Also comes with programs to read/change file attributes and display sectors in hexadecimal. Not copy protected.
CIRCLE **652** ON READER SERVICE CARD

***Mace + Utilities*, Version 4.0**
Paul Mace Software
123 First St., #8
Ashland, OR 97520
(800) 523-0258
List Price: $99.00
Requires: 256K RAM, DOS 2.0 or later.
In Short: Besides unfragmenting disks, *Mace* is able to recover the contents of a hard disk that has accidentally been reformatted. It diagnoses and remedies disk faults automatically and includes two *Norton*-like utilities. Also included are V-cache, a disk memory cache, V-screen for faster screen writing, and V-kette, a disk-speed-up utility. Not copy protected.
CIRCLE **651** ON READER SERVICE CARD

After the first file has been transferred, the word "CON" appears on the screen, while DOS waits for your input. Type whatever you'd like, including extra blank lines or whatever, and terminate your console input when you're through by pressing F6 (or Ctrl-Z) and Enter. DOS will then resume its concatenation with the second file.

Notice that the /A and /B options can be used when concatenating each time a different filename is specified, although the /V switch should only be included once at the end.

```
COPY FILE1/A+FILE2/B+FILE3 ALL/V
```

This example combines the three files as described above, although if FILE1 continues past the first occurrence of a Ctrl-Z, only the first portion is used. The second two files are then copied in their entirety, regardless of any Ctrl-Z characters: when /A or /B is entered it applies to all subsequent filenames until changed.

One of the reasons these various options are necessary in the first place is that some programs (such as early versions of BASIC) can write files only in multiples of 128 bytes. Even if a file is only 1 byte long, it would show in a DIR listing as being 128 bytes if it had been created by these older programs. Thus the Ctrl-Z is a means of marking the true end of the file's information. When DOS copies a binary file (either because it defaulted to binary or because you used /B), it uses the length field in that file's directory entry to determine the number of bytes to copy.

CHKDSK Most users invoke CHKDSK simply to find out how much disk space they have left or how little RAM their TSR utilities (and DOS) have left them with. The DOS CHKDSK program also offers a useful assortment of command line options, however.

If you give CHKDSK a filename (or group of them, using the DOS wildcards), it not only reports the usual diskwide information but also tells you how many "noncontiguous" clusters your file(s) contain(s). What with constant deletion and updating the files, "fragmentation" is bound to occur on a busy hard disk, and the only real penalty you pay for having different parts of the same file physically located at widely different parts of the disk is speed of access. When the contents of a file are scattered all over a disk, the drive's heads must do a lot of extra movement, which takes time.

When file fragmentation becomes severe enough to bother you, the cure is simply to copy *all* of the files to a second diskette (or series of them, if you're dealing with a hard disk) using COPY *.*. Do *not* use the DOS DISKCOPY command for this. DISKCOPY creates an exact clone of the original diskette—fragmented files and all—and, of course, it can't be used with a hard disk. If a new disk is formatted and the files are then copied to it, DOS will assign each file in an orderly fashion. Several commercial utility programs, some of which are listed in the accompanying fact files, are also available to eliminate fragmentation on a fixed disk. I use *H.D. Tuneup* from SofCap. [*I usually use* Mace.—*Craig L. Stark*]

The second CHKDSK option is /F (for Fix), which allows some measure of correction for a different—and far more serious—type of disk space allocation problem: cross-linked or orphaned clusters.

■ Most users invoke CHKDSK simply to find out how much disk space they have left or how little RAM their TSR utilities have left them with.

If a program begins to create a disk file but is interrupted part way through (the power fails, the drive door gets opened), DOS isn't able to complete the operation. What may well happen is that the contents of the file are written to disk and its sectors are identified in the file allocation table (FAT), but the directory shows it as having a length of zero. The file exists, it takes up disk space, but you can't get at it! Similar failures may result in two different files acquiring a common cluster identification number somewhere in the chain of file clusters contained in the FAT.

By using /F, CHKDSK can be instructed to seek out these abandoned disk clusters and either erase them or place them

into legitimate files (with such unlikely names as FILE0000.CHK, FILE0001.CHK, etc.) for you to inspect. Even if you fail to specify /F, CHKDSK will let you know that abandoned clusters exist, and, by reminding you that you did not specify /F, it urges you to run CHKDSK again using that option. If you want to see what is in the abandoned clusters, be sure to answer "Y" when CHKDSK asks if the clusters are to be put into files. Otherwise, they are simply erased.

The final CHKDSK option is /V (verbose?), which tells CHKDSK to not only check the disk for possible errors but also provide a listing of the files it encounters along the way. In fact, this is a good way to get a complete listing of all the files on a hard disk, since CHKDSK will search through each directory as it seeks out those fragmented files or lost clusters.

FORMAT FORMAT and FORMAT/S are familiar friends that initialize regular and self-booting diskettes, respectively. The FORMAT command also offers a number of other options, however, and, while some have become obsolete, others are brand new with DOS 3. Let's take a closer look.

Remember that when the IBM PC was first introduced, a floppy disk drive was considered an option—although I've never met anyone who used a PC with a cassette tape for storage. Most disk drives available for the PC at that time were single-sided, and DOS 1 put only eight sectors on each disk side—yielding a total storage capacity of only 160K bytes. As PC technology advanced and prices began to fall, however, newer drives became available that were able to write to both sides of a disk. Floppy disk manufacturing also improved, which meant that these newer disks could reliably hold nine sectors on each side, instead of only eight.

Consequently, some PC owners had single-sided drives, others had double-sided drives, and depending on which version of DOS was in use, either eight or nine sectors. The main problem was for the software producers, since they had to be able to accommodate the lowest common denominator. To ensure downward DOS compatibility, then, FORMAT includes these options:

FORMAT/1 causes a disk to be formatted on one side only, even if the drive is capable of writing to both sides.

FORMAT/8 creates eight sectors per track, instead of defaulting to the (now) usual nine.

With the introduction of the AT and its high-capacity (1.2-megabyte) drives, with 15 sectors per track, another option became necessary. Since some ATs have only a single such drive, and a regular PC can't read 15-sector disks, some means of formatting a 360K disk that can be read on a PC drive is needed. The FORMAT/4 option is intended to do this, though the process is sufficiently unreliable that IBM warns that such disks may not be readable by a regular PC drive anyway.

Normally, whenever a disk is formatted, DOS creates an area to hold the direc-

THE CONFIG.SYS FILE

A file named CONFIG.SYS, when present on the DOS disk that starts your PC, contains information that DOS must have early in the booting process. Like AUTOEXEC.BAT, the name CONFIG.SYS has special meaning to DOS at startup time. But what goes into a CONFIG.SYS file and why DOS needs this information so early in the game are worth examining.

BUFFERS When you enter the DIR command, DOS retrieves the list of filenames from the disk's directory and displays them on the screen. However, the letters and numbers that constitute the directory entry (name, size, date, and time) are not directly transferred from that portion of the disk to the display screen. Instead, they are first routed through an area of memory called a *disk buffer*. Disk buffers can each hold 512 bytes (the size of a disk sector), and are also used while files are being loaded or saved by a program, such as a word processor or spreadsheet.

Unless told otherwise, DOS reserves space for only two of these buffers at bootup. Since the memory that constitutes these buffers becomes attached to DOS's normal data area, there's just no reasonable way to let users alter the amount initially allocated for disk buffers short of rebooting the PC. One of the uses for the CONFIG.SYS file, then, is to tell DOS in advance to establish more than the default of two buffers. You would do this with a line such as

```
BUFFERS = 20
```

Up to a point, the more buffers that are available, the better DOS will be able to perform. But for each buffer you assign to DOS, 528 bytes are taken from the available memory in your PC. Therefore, if you specify 20 buffers, approximately 10K less RAM will be available for use by your programs. Moreover, when a very large number of buffers is allocated, it can actually take DOS longer to search through these buffers for information than to read the appropriate sector from disk in the first place. That last item could use explanation.

Since disk information is always transferred through these DOS buffers, the most recently read sectors are kept available in the buffers. This creates a tremendous improvement in access speed when the buffered information will be read repeatedly. You may have noticed, for example, that if you issue a DIR command on a hard disk twice in a row, the disk activity indicator often doesn't light the second time. The calculation for bytes free will also be faster in this case. Depending on how many filenames there are—and how many buffers are active—the second request for the directory's sectors can be fulfilled by merely reading memory rather than going out to the disk. Of course, all of this is transparent to both users and programmers and is performed by DOS automatically.

As a more dramatic example, one of my customers was complaining about how long it took to load a file into his office word processor. Upon investigation, I discovered there were more than 500 .DOC files in the directory. When I typed DIR, the first hundred or so names

went scrolling up the screen as usual. Suddenly, the display speed slowed to a crawl, and it took about 5 minutes for the listing to complete. I wasn't surprised to find no CONFIG.SYS file. Once one was created, with 20 buffers specified, DIR flew through the filenames.

FILES Additional memory must also be set aside when many disk files are to be used at once. This is a customary requirement, for example, of a relational database. Suppose, for instance, that you have set up a database program to print a dunning letter to all accounts that are more than 30 days overdue. In such a case, the database will need access to at least three different files at one time: the receivables file that shows when each bill was sent, the name and address file for printing the envelopes, and, finally, a file containing the text of the letter.

At other times, even more files may need to be available simultaneously, and for each such file DOS must maintain a small area of memory to hold information about the file. Thus, as with BUFFERS, if you anticipate that many files will be in use at once, you must also inform DOS of this while it is starting. A safe number to use is probably ten or so. DOS requires three just for its own use, which would give you another seven on top of that. The reserved files that DOS uses are called Standard Input (the keyboard), Standard Output (the display screen), and Standard Printer (LPT1:). Again, like BUFFERS, each additional file that is specified takes some memory from the system. In this case, though, each requires only 48 bytes.

DEVICE The last CONFIG.SYS statement available under DOS 2 is used to load a device driver into memory. Like BUFFERS and FILES, device drivers remain resident in memory until the PC is rebooted. However, unlike those two—which are areas of memory reserved to hold data—a device driver is really a program.

Many PC users know about the ANSI.SYS device driver because it comes with DOS. It is included mainly to provide a standard interface for programs, regardless of which brand of computer they will be run on. (There are also quite a few useful tricks that may be done using ANSI.SYS, as regular readers of User-to-User already know.) The "devices" being referred to here are the display screen and the keyboard. To install ANSI.SYS simply requires entering

```
DEVICE = ANSI.SYS
```

in your CONFIG.SYS file. Why might you want to?

Programs created on an IBM PC or close compatible generally call upon the built-in BIOS routines to do the actual work of positioning the cursor and displaying information on the screen. These are common tasks, and it makes sense for a programmer to make use of those services. However, any program that relies upon the BIOS will be limited to running on an IBM PC or true clone.

These days, you'll find that nearly every PC is pretty much IBM compatible, though when the IBM PC first came out, this was not the case. If you were writing a legal billing program, for example, and wanted to be sure it would run on as many machines as possible, the safest approach was to use ANSI.SYS. Rather than call upon specific routines in the PC's BIOS, ANSI.SYS accepts standard commands and works in the same manner on all machines.

ANSI.SYS can help out in the other direction too, allowing compatibles to run programs written for the IBM. For example, attempting to run Borland's *SuperKey* on a Leading Edge Model D results in a message that ANSI.SYS must be installed first.

ADDITIONAL DEVICE DRIVERS You are not restricted to including only one DEVICE = *xxx*.SYS in your CONFIG.SYS file. The VDISK program that comes with DOS 3 is yet another example of a device driver, though in this case, VDISK simulates a different kind of device—a disk drive.

Finally, programmers can design custom device drivers for special hardware when it is required. An associate of mine recently designed a special circuit that allows a PC to control the positioning of a precision turntable used in manufacturing. But since the main program is written in BASIC, a device driver was required to communicate with the custom hardware.

One of the nice things about using a device driver this way is that from BASIC (or any other high-level language), the device may be opened and closed just like a disk file. Once opened, the program can merely use BASIC's PRINT command to send information to the device and INPUT to receive it.

—Ethan Winer

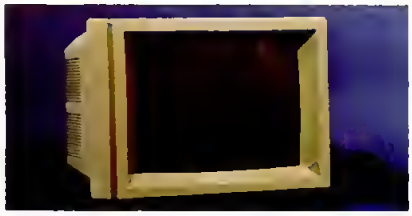
tory and file allocation tables (FATs) and allows the remaining space to hold your files. But if you want to create a bootable disk—that is, one with a copy of DOS already on it—you must format it with the /S option. Whatever version of DOS is currently running will be placed on the disk while it is being formatted. This can be a great convenience if you don't have a hard disk and generally use only one or two applications programs. By formatting the disk with a copy of DOS already on it and then copying your programs to it, only a single floppy disk will be needed.

You can, however, format a disk that will *ultimately* become bootable without actually putting the DOS system in place. This is the FORMAT/B option, which is intended principally for software producers, since they are not legally allowed to distribute DOS (which is copyrighted) along with their programs. This allows the user to put a copy of the DOS version he wants onto the distribution copy of a software package. (This may actually be required, since the DOS that comes with many PC compatibles is not exactly the same as the versions that come with a PC.) Before using this option yourself, however, check the size of your program(s). The

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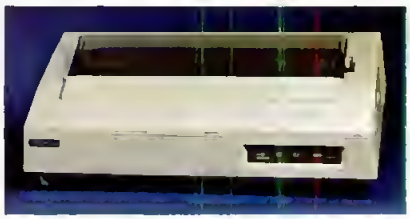
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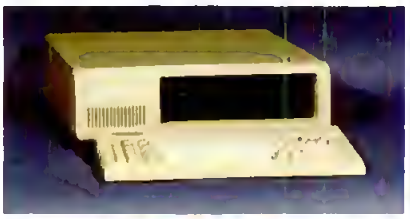
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CIRCLE 183 ON READER SERVICE CARD

■ PC LAB NOTES

/B option formats the disk in eight sectors, restricting capacity to 320K instead of 360K.

A final and more useful FORMAT option is /V, which allows you to give a volume label (a name up to 11 characters long) to a disk. Many users don't bother with this feature, which is a shame. By naming a disk, an applications program can readily determine if the correct disk is installed before reading or writing to it. It can also make it easier for a novice user to determine which disk is which. (If you forget to select the /V option while formatting, however, *The Norton Utilities* includes a program that will add a volume label to a disk *after* it has been formatted. The Norton program also permits you to use both upper- and lowercase letters; the DOS /V format option always capitalizes what you type.)

FIND The DOS FIND program is useful for locating occurrences of a particular text phrase in a disk file, and it accepts a variety of options too. The command syntax for using FIND is

```
FIND [/V/C/N] "string" filename
```

If the given string is found in the specified file, that line will be displayed on the screen. But when you're searching very long files, it can also be helpful to know which lines contain that text. Using /N instructs FIND not only to display any lines that have the particular phrase in them, but also to display their relative line numbers as well. This simplifies your job if you will be calling up that file in your word processor later on. If only the total count of the number of lines is needed, use the /C option. And finally, the /V switch causes all of the lines that do not contain the string to be displayed.

SORT The SORT program that comes with DOS is yet another "filter" that accepts command line options. Specifically, these allow you to specify sorting in reverse order and/or to base the sort on a particular beginning column number.

SORT /R means to do a reverse sort (Z before Y). To sort a file based on a column number other than the first one, use a plus sign followed by a column number. For example, to "pipe" a directory listing through the SORT filter to list the files by their extensions (rather than by their names) you would use

```
DIR | SORT /+10
```

since the extension begins in the tenth column. To reverse the order of the extension sort, you would instead use

```
DIR | SORT /R/+10
```

Note that the /R must be before the /+10 to be recognized. Note also that beginning with DOS 3.0, Microsoft has provided an enhanced version of SORT that ignores the difference between upper- and lowercase letters. This way, "also" will come before "And"; under DOS 2.*x* it would not.

COMMAND Everyone knows that COMMAND.COM is one of the programs that constitutes DOS. Indeed, it is the very part of DOS responsible for interpreting the commands you enter and figuring out what to do with them. But what many don't realize is that, being a .COM program, COMMAND.COM can also be run directly from the DOS command line.

■ The DOS FIND program is useful for locating a particular text phrase in a disk file.

This capacity is referred to (rather cryptically) in the DOS manuals as "Invoking a Secondary Command Processor." The feature first appeared with DOS 2.0 and was added more for the convenience of programmers than for end users. You may have noticed that many of the new applications programs (*Word Perfect* 4.1 and *DataEase* 2.5 among others) either allow running an external program from within them or let you temporarily drop to DOS until you type EXIT. When this happens, internally the application is actually executing another copy of COMMAND.COM.

COMMAND can also be run by itself, however, and this is what allows you to execute nested batch files. If you've ever tried to have one batch file call a second one and then return to the first to resume execution, you've probably been disappointed. When the second one finishes, the DOS prompt reappears. But if the first batch file calls the second through COMMAND.COM with the /C option as shown below, however, it will work as you intended it to.

```
COMMAND /C BATCH2
```

This parameter tells DOS to load a second copy of the command processor and have that execute the instruction that follows—in this case, BATCH2.BAT.

Also impossible any other way is to repeatedly call a batch file with the FOR command. Unless you invoke a second copy of COMMAND.COM, the batch file only works once. Here's an example based on my personal experience.

As a software developer, I keep track of the various versions of my programs by the date and time stamps in the disk directory. Before issuing a new release, I always date-stamp all of the files on the master disk using Peter Llewellyn's excellent UPDATE program (printed in User-to-User, Volume 5 Number 8). But UPDATE.COM doesn't accept wildcards, so I can't just say

```
UPDATE A:*.*
```

Further, even if I could, since it takes more than a minute to process all of the files, the times would not end up the same. Instead, I use the FOR command to specify each file on the disk and invoke a batch file—first to set the time, and then to call UPDATE.COM. This command is typed directly at the DOS prompt, thus:

```
FOR %F IN (A:*.*) DO COMMAND/C REDATE %F
```

The contents of REDATE.BAT are simply the two lines

```
TIME 20
UPDATE %1
```

If you're not familiar with the FOR command used in the above example, you might think of its syntax as

```
FOR each x DO y
```

The first time through, the variable %F holds the name of the first matching file. For subsequent files, %F holds the name of each one in turn. And if the variable %F is then passed to a batch file that uses its own internal variables, the original filename may be referred to by the batch file's variable. Hence, %F in the FOR command becomes %1 within the batch file. (If you think this is complicated, check out UNIX sometime.)

Observe, however, that if the FOR command is used within a batch file, two percent signs must be used for its variable, as shown below:

```
FOR %%F IN (A:*.*) DO COMMAND /C REDATE %%F
```

There are two other COMMAND options that deserve at least a mention at this point. The /P option not only invokes a second copy of COMMAND.COM but makes it permanent until you reload DOS. That is, even if you type EXIT, you won't return to the original COMMAND.COM. And, new with DOS 3.0, if you enter

```
COMMAND/E:xxxx
```

where *xxxx* is a number between 160 and 32,738, you set aside a certain number of bytes for the environment table that DOS maintains. DOS 3's environment is a complete topic in itself and will be covered in the second part of this article.

REPLACEABLE PARAMETERS Since I've already introduced the subject of batch files and the FOR command, it would be a good idea here to take a closer look at these replaceable parameters. This is yet another powerful feature of DOS that is not fully understood by many users.

Many programs allow passing additional information to them on the command line. For example, *WordStar* lets you specify the name of the file to be created or edited, like this:

```
WS filename
```

You can also create batch files that accept command line options, either to operate on a file whose name was entered or to perform certain actions that depend specifically on what was entered. DOS can keep track of up to nine separate command line variables, which are named with a percent sign followed by a number between one and nine. In fact, even more parameters can be processed by using the SHIFT command, and I'll get to that in just a moment.

Whenever a batch file is called up and additional words are typed on the same line following its name, each of those words can be referred to as a variable. Suppose you have a batch file named GO.BAT that consists of the lines

```
CD \%1
%1
```

If you then enter the command

```
GO LOTUS
```

the batch file will first execute the command CD\LOTUS, followed immediately by LOTUS. If you keep all of your applications in a directory with the same name as the programs, this can simplify navigating between them.

The main point, however, is that the variable %1 in GO.BAT holds whatever word followed the command to start the batch file in the first place. Had two parameters been passed, the second would be known to the batch file as %2, regardless of what word was actually entered. In fact, if this batch file is to work correctly with *WordStar* (which accepts parameters of its own), at least two variables should be used. Below is a revised GO.BAT:

```
CD \%1
%1 %2
```

If you then type

```
GO WS filename
```

GO.BAT will first change to the directory WS (%1) and then execute the command WS (again %1), but then it will also pass the specified filename to the program (%2). To accommodate any possibility, you could write GO.BAT like this:

```
CD \%1
%1 %2 %3 %4
```

Any additional parameters will be ignored if nothing else is entered on the command line.

An interesting feature of this use of variables is that the original command that is entered (in this case GO) is also available as the variable %0. If for some reason you wanted a batch file to call itself at some point in the process, you could enter the command %0 to do this. Even though you could just as easily put the name of the batch file within itself, it would cease to operate if it were renamed.

You'll notice that these replaceable parameters are all identified by a percent sign and a number, whereas the FOR command requires a letter variable instead. Also notice that letter variables are case sensitive. That is, to DOS, %T and %t are two separate variables.

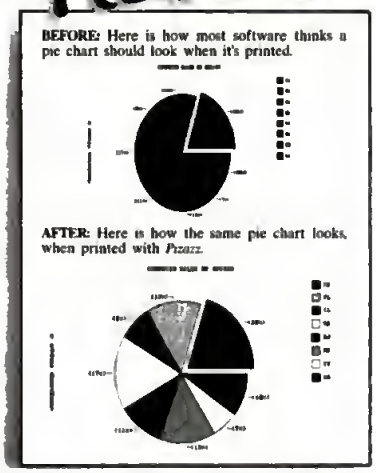
■ Batch file variables allow comparing the entries on the command line with a range of acceptable entries.

IF TESTING IN A BATCH FILE One of the main uses of batch file variables is to allow comparing what was entered on the command line with a range of acceptable entries. For example, many consultants who set up office PC systems like to guard against any possibility that novice users might accidentally reformat their hard disks. There are many ways to do this, but a common method is to rename FORMAT.COM to something obscure, such as XFORMATX.COM. Then, a batch file named FORMAT.BAT is created that disallows the drive letter "C". Such a batch file might look like this:

```
IF %1==C: GOTO ERROR
IF %1==c: GOTO ERROR
IF %1==C GOTO ERROR
IF %1==c GOTO ERROR
XFORMATX %1
:ERROR
```

If someone now enters the command FORMAT C: (or format c:, with or without the colon), the batch file will immediately end. Of course, you could get much fancier and have the batch file print error messages or do additional testing of what was entered.

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■ PC LAB NOTES

ADDITIONAL IF TESTING Another frequently needed IF test checks to determine whether any parameters were entered at all. Unfortunately, if you simply try

```
IF %1== GOTO NONE
.
.
:NONE
```

DOS would respond with a SYNTAX ERROR because the statement is incomplete. The trick is to add an extra, dummy character into the test, thus:

```
IF X%1==X GOTO NONE
.
.
:NONE
```

This way, at least both sides of the equal signs contain something. If %1 is a null string, then X%1 will be equal to X, and the batch file will handle it correctly.

SHIFT Personally, I have never needed to use more than two or three parameters at a time; however, it is possible to use more than nine with the SHIFT batch command. Every time SHIFT appears in a batch file, any parameters that were entered are shifted downward by one. That is, the first parameter will now be referred to as %0, the second %1, etc.

■ A frequently needed IF test checks to see whether any parameters were entered at all.

One very useful way to use the SHIFT command in your batch files is illustrated by the SETUP.BAT file shown below, which lets you specify one or more printer setup options on the command line. Acceptable choices are NLQ (near-letter-quality), COMP (compressed), and NORM (normal). Notice that all of the comparisons are performed using both upper- and lowercase to ensure that they will work either way. The contents of SETUP.BAT are

```
ECHO OFF
:START
IF X%1==X GOTO DONE
IF %1==NLQ ECHO <Alt-155>G > PRN
IF %1==nlq ECHO <Alt-155>G > PRN
IF %1==COMP ECHO ^O > PRN
IF %1==comp ECHO ^O > PRN
IF %1==NORM ECHO <Alt-155>H^R > PRN
IF %1==norm ECHO <Alt-155>H^R > PRN
SHIFT
GOTO START
:DONE
```

(Important: The <Alt-155> in the example above is produced by holding down the Alt key, hitting 155 on the numeric keypad, and then releasing the Alt key. This is perhaps the easiest way to embed an Escape character in DOS. However, be sure to type in the ">" signs preceding the final PRNs above—these redirect the codes to the printer. As an alternative, you could write the batch file with a word processor using any unused ASCII letter code in place of Escape and then use DEBUG to change each instance of that letter in the batch file to 1Bh.)

Using this batch file with an Epson/IBM printer, to enable near-letter-quality printing you would enter

```
SETUP NLQ
```

To establish both near-letter-quality and compressed printing you would enter

```
SETUP NLQ COMP
```

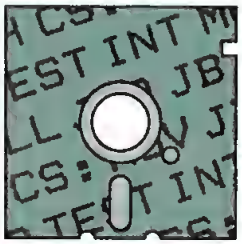
The interesting feature of using SHIFT in this way is that all of the parameters will be referred to as %1. Therefore, the same comparison instructions can be used to check what you typed—regardless of the order in which they were entered. Though ECHO OFF is used at the beginning of this batch file to keep the screen from becoming cluttered, omitting that line will allow you to watch the various tests.

You may wish to note that using ECHO this way to redirect control codes to the printer does not work reliably under DOS 2. It generally works correctly the first time you run it, but thereafter DOS reports a "file creation error." This problem has been fixed with DOS 3, whose many new features will be the focus of attention in the second part of this article.

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■ PROGRAMMING/UTILITIES ■ MICHAEL J. MEFFORD

A VERY SAVVY SEARCH UTILITY



Faster than a speeding bullet, SEARCH.COM combines file search and string search functions within a single program that has case sensitivity and printer echo options.

Every one of the many ingenious systems for helping people keep track of their disk files seems to demand more self-discipline than I've got. Invariably I forget which cleverly named file says "send more money"; worse, I can't even remember in which directory I filed it. If this sounds familiar, what you need is SEARCH.COM.

SEARCH will scan your disk for a particular file or search through your files for a particular string—or combine these two operations. To use it you enter

```
SEARCH [d:][path][filename] [string][/P][/C][/B]
```

Admittedly it's a little unusual to find a command syntax in which all the parameters seem to be optional. The reason is that you are actually getting two programs in one: a file searcher and a string searcher. You must give SEARCH at least one argument. The more parameters you add, the narrower the search will be. The default is a diskwide search that includes all subdirectories. The filename can include the global asterisk and question mark characters. If you include a string to be found, SEARCH will report the line number of the first match. The string must be enclosed in quotes, but you may also include quotes in the string. To cancel the search, press Ctrl-C or Ctrl-Break. A few examples will show how SEARCH works.

If you want a list of all the backup files on your hard disk and the default drive is C:, you would enter

```
SEARCH *.BAK
```

Add a drive if you want to search one other than the default. If you want to find all the files on A: that contain the string "Dear Dr. Livingstone", enter

```
SEARCH A: "Dear Dr. Livingstone"
```

```
;                    Search.asm
; FORMAT: SEARCH [d:][path][filsnams] [string][/P][/C][/B]
; At least one parameter must be entered.
; /P=printer  /C=case sensitive  /B=includes executable files
; in string searches.  Default is diskwide search.  Limit search
; by adding parameters.  String must be enclosed in quotes.

CODE SEGMENT                          ;*************************
ASSUME CS:CODE,DS:CODE                ;*                       *
ORG 100H                              ;*  REMEMBER TO EXE2BIN  *
                                      ;*                       *
START:          JMP     BEGINNING     ;*************************

;               DATA AREA
;               ---------
COPYRIGHT       DB   'Copyright 1986 Ziff Davis Publishing Co.',1AH
PROGRAMMER      DB   'Michael J. Mefford'
SEARCH_SPEC     DW   OFFSET GLOBAL
GLOBAL          DB   '*.*',0
ROOT            DB   '\',0
PARENT          DB   '..',0
CURRENT_DISK    DB   ?
PATH_END        DW   ?
PARA_START      DW   ?
GOOD_PARA       DB   0
STRING_START    DW   ?
STRING_CT       DW   0
LINE_NUM        DW   1

STRING_FLAG     DB   0
PATH_FLAG       DB   0
PRINT_FLAG      DB   0
CASE_FLAG       DB   0
BINARY_FLAG     DB   0
EOF_FLAG        DB   0
MATCH_FLAG      DB   0
DISPLAY_FLAG    DB   0

EXE             DB   'EXE'
COM             DB   'COM'
BAD_PARA        DB   'Invalid parameters',7,'$'
SEARCH          DB   13,10,'Searching for ',0
DIRECTORY       DB   13,10,13,10,'Directory ',0
LINE            DB   9,'Line number ',0
SPACING         DB   13,10,32,32,0

DIR_ATTRIBUTE   EQU 10H
ALL_FILES       EQU  6H
QUOTES          EQU 22H

;-------------------------------------------------------------;
; The first task is to initialize 100 bytes at the end of code ;
; to ons.  This will be used to track the directory level.     ;
; The current drive and directory and drive will be saved.     ;
```

(continues)

Figure 1: *The assembler source code for SEARCH.COM.*

■ PROGRAMMING/UTILITIES

By default, when you add a string to the parameters, SEARCH does not look through executable files—namely, files with the extension .EXE and .COM. This normally would not be desirable, and their exclusion speeds up the search. If, however, you want to include these files in the search, just add the /B binary switch. For example, to find all the files in the root directory that explicitly reference IBM, enter

```
SEARCH \ "IBM"/B
```

Since the reported line number is just a count of the character 13, it will be meaningless in binary files. You do not have to include the binary switch if the search spec does not include a string.

String searches by default are not case sensitive. To make your string searches case sensitive, add the /C case switch.

Since the search defaults to diskwide, it might take up to ten minutes to go through everything on a stuffed 10-megabyte hard disk. While this is reasonably fast, if you do not wish to stand by and monitor the output, you can echo the list to the printer by using the /P switch. Thus, to send a list of all the files that contain the string "Microsoft" to the printer, enter

```
SEARCH "Microsoft"/P/C/B
```

If you specify a path, the search will be restricted to the given directory. To get a list of all the letters in your WS directory with the string "Send big bucks", enter

```
SEARCH \WS "Send big bucks"
```

SEARCH successfully found that string in many of my letters. I just wish the letters themselves had been equally successful. [*Mr. Mefford is a free-lance writer.—Ed.*]

To print a complete list of all the files in every directory, enter

```
SEARCH *.*/P
```

■ To make your string searches case sensitive, add the /C case switch.

```
; Then the command line at 80H in the PSP will be parsed.      ;
;-------------------------------------------------------------;

BEGINNING:      CLD                             ;All string instructions will be
                MOV     AL,1                    ; done in a forward direction.
                MOV     CX,100                  ;Initialize directory subscripts
                MOV     DI,OFFSET SUBSCRIPTS    ;to one.
                REP     STOSB

                MOV     AH,19H                  ;Retrieve and save the current
                INT     21H                     ; drive.
                MOV     CURRENT_DISK,AL

                MOV     SI,OFFSET CURRENT_DIR+1     ;Leave room for "\".
                MOV     DL,0
                MOV     AH,47H                  ;Retrieve and save the
                INT     21H                     ; the current directory.
                MOV     DX,OFFSET DTA           ;Point the disk transfer address
                CALL    CHANGE_DTA              ; to the end of code.

                CMP     BYTE PTR DS:[80H],0     ;If no parameters, exit with error.
                JA      FIRST_PARA
                JMP     EXIT
FIRST_PARA:     MOV     SI,82H                  ;Point to the first byte of the
NEXT_PARA:      LODSB                           ; command line.
                CMP     AL,32                   ;Scan off leading spaces.
                JZ      NEXT_PARA
                CMP     AL,QUOTES               ;If no filespec, parse string.
                JNZ     CK_CR
                JNP     STRING
CK_CR:          CMP     AL,13                   ;If no parameters, exit with error
                JNZ     CK_DRIVE
                JMP     EXIT

CK_DRIVE:       CMP     BYTE PTR [SI],':'
                JNZ     ND_DRIVE                ;If drive spec exists,
                AND     AL,5FH                  ; convert drive to DOS format by
                SUB     AL,'A'                  ; capitalizing and changing to
                MOV     DL,AL                   ; hex number.
                MOV     AH,0EH                  ;Change drive.
                INT     21H
                INC     SI
                CALL    PARA_END                ;If end of filespec, done parsing
                JC      DRIVE_ONLY              ; here
                LODSB                           ; otherwise get next parameter.
                CMP     AL,QUOTES               ;If it's quotes exit with error.
                JNZ     NO_DRIVE                ; (need a space delimiter
                JMP     EXIT                    ; before string.)

ND_DRIVE:       MOV     PARA_START,SI           ;We now are pointing to the start
                DEC     PARA_START              ; of the filespec parameter.
                MOV     PATH_END,SI             ;Will assume the end of path to
                DEC     PATH_END                ; be parameter start-1.
                DEC     PATH_END
                CMP     AL,'\'                  ;If search is to start at root,
                JNZ     CK_GLOBAL               ; change the directory to the root
                MOV     DX,OFFSET ROOT          ; and adjust the start pointer.
                CALL    CHANGE_DIR
                MOV     PATH_FLAG,1             ;Flag that a path exists.
                INC     PARA_START
                CALL    PARA_END
DRIVE_ONLY:     JC      NEXT_DELIMIT            ;If no other filespec, done here.
CK_GLOBAL:      CMP     AL,'*'                  ;If *.*, search the entire disk.
                JNZ     CK_SWITCH
                LODSB
                CMP     AL,'.'
                JZ      GOT_DOT
                JMP     EXIT
GOT_DOT:        LODSB
                CMP     AL,'*'
                JZ      NEXT_DELIMIT
CK_SWITCH:      CMP     AL,'/'                  ;  We will loop from here to >----+
                JNZ     NEXT_FILESPEC           ;                                |
                CALL    SWITCH                  ;                                |
                CMP     AL,QUOTES               ;If quotes without space,        |
                JNZ     NEXT_FILESPEC           ;                                |
                JMP     EXIT                    ; exit with error.               |
NEXT_FILESPEC:  LODSB                           ;                                |
                CMP     AL,32                   ;If space character or below,    |
                JBE     FILESPEC                ; we have the filespec.          |
                CMP     AL,'\'                  ;Check for path.                 |
                JNZ     CK_SWITCH               ;                                |
                MOV     PATH_FLAG,1             ;                                |
                MOV     PATH_END,SI             ;If path found, update variables.|
                DEC     PATH_END                ;                                |
                JMP     SHORT CK_SWITCH         ; here to find the filespec. <----+

;-------------------------------------------------------------;
; Now that we have the filespec, will check if it is a path. ;
;-------------------------------------------------------------;
```

(Figure 1 continues)

```
FILESPEC:       MOV     BL,AL                   ;Seve current delimiter.
                MOV     BYTE PTR [SI-1],0       ;Formet the end for DOS with e 0.
                MOV     BYTE PTR DTA+21,0       ;Initiete file ettribute to 0.
                MOV     DX,PARA_START
                MOV     CX,10H
                CALL    FIND_FIRST              ;Get file's ettribute vie DOS.
FOUND_FILE:     CMP     BYTE PTR DTA+21,10H
                JNZ     NO_PATH                 ;If it is e path, updete veriehles
                MOV     PATH_FLAG,1
                MOV     PATH_END,SI
                DEC     PATH_END
                JMP     SHORT CK_DELINITER
ND_PATH:        MOV     DX,PATH_END             ; otherwise, it ie e filename;
                INC     DX                      ; updete path end; chenge seerch
                MOV     SEARCH_SPEC,DX          ; spec from global to filename.
CK_DELINITER:   CMP     BL,13                   ;Check if delimiter is carriege
                JZ      NO_STRING               ; return.  If yee, no string.

;---------------------------------------------------------------;
; Done with fileepec.  Now continuing by parsing etring parameter. ;
;---------------------------------------------------------------;

NEXT_DELIMIT:   LODSB
                CMP     AL,32                   ;Scan off delimiting epeces.
                JZ      NEXT_DELINIT
                CMP     AL,'/'                  ;Check if switch.
                JNZ     NO_SWITCH
                CALL    SWITCH
                JMP     SHORT NEXT_DELIMIT
NO_SWITCH:      CMP     AL,13                   ;If cerriege return, no etring.
                JZ      NO_STRING
                CMP     AL,QUOTES               ;If quotes, etert of string.
                JNZ     NEXT_DELIMIT

STRING:         MOV     STRING_FLAG,1           ;Fleg thet string existe.
                MOV     STRING_START,SI         ;Point to stert of etring.
                XOR     BH,BH
                MOV     BL,BYTE PTR DS:[80H]
                ADD     BX,81H                  ;Point to end of parameters and
NEXT_QUOTE:     DEC     BX                        ;work backwerde until find
                CMP     BYTE PTR DS:[BX],QUOTES   ;first quotes.
                JZ      END_STRING
                CMP     BX,SI                   ;If only one quote,
                JZ      EXIT                    ; exit with error.
                JMP     SHORT NEXT_QUOTE

END_STRING:     MOV     BYTE PTR DS:[BX],0      ;Got end of etring; merk with 0.
                PUSH    BX                      ;Seve position.
                SUB     BX,SI                   ;Subtrect to get etring length.
                MOV     STRING_CT,BX
                POP     SI                      ;Reetore position.
LAST_PARA:      LODSB                           ;We heve the etring.  Now ell
                CMP     AL,'/'                  ; heve left to do is check for
                JNZ     LAST_SWITCH             ; switchee.
                CALL    SWITCH
LAST_SWITCH:    CMP     AL,13
                JNZ     LAST_PARA

;-----------------------------------------------------;
; If no caee seneitive switch, cepitelize the string. ;
;-----------------------------------------------------;

                CMP     CASE_FLAG,1
                JZ      NO_STRING
                MOV     CX,STRING_CT
                MOV     BX,STRING_START
                CALL    CAPITALIZE

;-----------------------------------------------------;
; If we got thie fer, the parameters were found velid.      ;
; If e string wee found, dieplay it.  If path wes found,    ;
; chenge directory end seerch, otherwise do global seerch. ;
;-----------------------------------------------------;

NO_STRING:      MOV     GOOD_PARA,1             ;Fleg es good parameters.
                CMP     STRING_FLAG,1           ;If string existe, dieplay it.
                JNZ     STRINGLESS
                MOV     BI,OFFSET SEARCH
                CALL    WRITE_STRING
                MOV     BI,STRING_START
                CALL    WRITE_STRING
STRINGLESS:     CMP     PATH_FLAG,1
                JNZ     GLOBAL_SEARCH           ;If path doee not exist, do globel
                MOV     BX,PATH_END             ; seerch, otherwiee, chenge
                MOV     BYTE PTR [BX],0         ; directory and dieplay it.
                MOV     DX,PARA_START
                CALL    CHANGE_DIR
                CALL    PRINT_DIR
                MOV     DX,SEARCH_SPEC          ;Find first matching filename.
                MOV     CX,ALL_FILES
                CALL    FIND_FIRST
```

(Figure 1 continues)

GETTING A COPY OF SEARCH If you have a modem, you can download SEARCH.COM directly and without charge from the PC Magazine Interactive Reader Service, as explained in the sidebar "Downloading SEARCH." The assembly language source code, SEARCH.ASM, is shown in Figure 1, and Figure 4 contains a BASIC program that will automatically create SEARCH.COM when you run it once. To save typing, SEARCH.ASM and SEARCH.BAS are also available from PC-IRS.

UNDERSTANDING SEARCH Much of the power of assembler programming consists in using the various subroutines (interrupts) built into the BIOS (basic input/output system) in ROM and the higher-level DOS (disk operating system) subroutines in RAM. If an assembly language programmer had to devise all the code these interrupts provide, his task would be onerous, indeed. SEARCH uses only 1 BIOS interrupt, but it uses 15 DOS interrupt 21h function calls, as shown in Figure 2. It's the use of these 16 interrupts that allows SEARCH to do so much in less than 1,300 bytes of code.

```
INT 10H   BIOS
FUNCTION  CALL
03H   Reed cursor position

INT 21H   DOS
FUNCTION  CALL
02H   Displey output
05H   Printer output
09H   Print string
0EH   Select diek
19H   Current disk
1AH   Set diek trenefer eddrsee
3BH   Chenge current directory
3DH   Open e file
3EH   Close e file
3FH   Reed from e file or device
42H   Move file reed/write pointer
47H   Get current directory
4EH   Find first matching file
4FH   Find next matching file
```

Figure 2: *The BIOS and DOS services used by SEARCH.COM.*

Here's how SEARCH uses these subroutines in going through your documents. First, the memory at the end of code is set up as a workspace. The DTA (disk transfer address) is set (DOS function 1Ah) to point to this workspace. After the current disk (19h) and directory (47h) are retrieved and saved, SEARCH has the tedious task of parsing the command line to find out what

you want it to do. Proper syntax is checked so that you will get logical results once the searching begins. If, for example, no parameters are found, an error message is displayed (09h), a beep is sounded, and you are returned to the DOS prompt.

NARROWING THE SEARCH If a colon is found as the second printable character, the preceding character is capitalized and converted to the format (0=A, 1=B, etc.) that function 0Eh (Select Disk) needs to change the drive. Upon exit, the drive will be restored to what it was. The command line is scanned for the \ character and, if found, it is noted that a path was requested so that the search will be limited to a single directory. If a filename is found, it is separated from the path by a zero. A zero byte is used as an end-of-string marker in many DOS function calls. The directory is changed (3Bh), and the first matching filename is searched for by issuing function call 4Eh. If, on return, the carry status is cleared (not set), a match has been found. Then the subroutine READ_FILE is called upon to decide whether or not to display the file. (More on this shortly.) Find First (4Eh) is issued only once and is followed by Find Next (4Fh).

Find Next does what its name implies and is called upon until the carry flag is set, indicating that no more matching files were found. At this point, the search is complete, and you are returned to the DOS prompt.

SEARCHING ACROSS THE DISK Searching a single directory is fairly simple; the trick is to do a search across the entire disk—that is, all directories. To accomplish this, SEARCH uses a combination of function calls (Find First, Find Next, and Change Directory), all the time keeping track of where it is in the directory tree.

The directory tree is a two-dimensional array. The distance up the tree is one dimension, and the branching of the subdirectories is the second dimension. In a global search, the first thing to be done is to change the directory to the root. All matching files are found using the same technique as above, and then we are off and running. Find First is issued again, only this time around we are looking for

```
                JC      EXIT                    ;If no match, exit.
                CALL    READ_FILE               ;If string, read the file.
NEXT_PATH:      CALL    FIND_NEXT               ;Loop here finding subsequent
                JC      EXIT                    ; matching files until no more.
                CALL    READ_FILE
                JMP     SHORT NEXT_PATH

;-------------------------------------------------------;
; This is the exit. The drive and directory is restored ;
; to how it was found. If parameters are invalid, error ;
; messages is displayed, otherwise, just return to DOS. ;
;-------------------------------------------------------;

EXIT:           MOV     DL,CURRENT_DISK         ;Change drive.
                MOV     AH,0EH
                INT     21H

                MOV     DX,OFFSET ROOT              ;Assume we came from root.
                CMP     BYTE PTR CURRENT_DIR,0      ;If root, it will be a zero.
                JZ      CHANGE_IT
                MOV     BYTE PTR CURRENT_DIR,'\'    ;Else, format with "\"
                MOV     DX,OFFSET CURRENT_DIR
CHANGE_IT:      CALL    CHANGE_DIR              ;Change directory.
                MOV     DL,13                   ;Clear printer buffer
                CALL    DISPLAY                 ; carriage return and linefeed.
                MOV     DL,10
                CALL    DISPLAY
                CMP     GOOD_PARA,1
                JZ      DONE
                MOV     DX,OFFSET BAD_PARA
                MOV     AH,9H
                INT     21H                     ;Display error message if invalid.
DONE:           INT     20H                     ;Terminate.

;-------------------------------------------------------------;
; This routine will systematically change directories up and  ;
; down the directory tree, searching for the matching filename. ;
;-------------------------------------------------------------;

GLOBAL_SEARCH:  MOV     DX,OFFSET ROOT          ;Start the search from root.
                CALL    CHANGE_DIR
                MOV     BP,OFFSET SUBSCRIPTS    ;Point to first level directory.
FIRST_FILE:     CALL    PRINT_DIR               ;Print the directory.
                MOV     DX,SEARCH_SPEC
                MOV     CX,ALL_FILES            ;Find first matching filename
                CALL    FIND_FIRST              ; in this directory.
                JC      FIRST_DIR
                CALL    READ_FILE

NEXT_FILE:      CALL    FIND_NEXT               ;Find next matching filename.
                JC      FIRST_DIR
                CALL    READ_FILE               ;If string, read the file.
                JMP     SHORT NEXT_FILE         ;Loop here until no more matches.

PARENT_DIR:     CMP     BP,OFFSET SUBSCRIPTS    ;When we try to return to parent
                JZ      EXIT                    ; directory and are in root, we
                MOV     DX,OFFSET PARENT        ; are done. Otherwise, change
                CALL    CHANGE_DIR              ; to parent directory.
                MOV     BYTE PTR DS:[BP],1      ;Put one back in previous level
                DEC     BP                      ; end point to parent level.


FIRST_DIR:      XOR     BL,BL                   ;Use BL as pointer to directory no.
                MOV     DX,OFFSET GLOBAL
                MOV     CX,DIR_ATTRIBUTE        ;Ask for global match.
                CALL    FIND_FIRST              ;Find first matching.
                JC      PARENT_DIR
CK_DIR:         CMP     BYTE PTR DTA+21,10H     ;If not a directory get next.
                JNZ     NEXT_DIR
                CMP     BYTE PTR DTA+30,'.'     ;If it is a dot directory get next.
                JZ      NEXT_DIR
                INC     BL                      ;Increment position in directory.
                CMP     BL,DS:[BP]              ;Continue until new directory.
                JNZ     NEXT_DIR
                INC     BYTE PTR DS:[BP]        ;Update variables.
                MOV     DX,OFFSET DTA+30
                CALL    CHANGE_DIR              ;Change the directory.
                INC     BP
                JMP     SHORT FIRST_FILE        ;Get all files in new directory.

NEXT_DIR:       CALL    FIND_NEXT               ;Get all subdirectories in current
                JC      PARENT_DIR              ; directory then go to parent.
                JMP     SHORT CK_DIR

                ;*************;
                ; SUBROUTINES ;
                ;*************;

CHANGE_DIR:     MOV     AH,3BH
                INT     21H
                RET

CHANGE_DTA:     MOV     AH,1AH
                INT     21H
```

(Figure 1 continues)

```
                RET

FIND_FIRST:     MOV     AH,4EH
                INT     21H
                RET

FIND_NEXT:      MOV     AH,4FH
                INT     21H
                RET

;-------------------------------------------------;
; This subroutine checks for delimiting characters. ;
;-------------------------------------------------;

PARA_END:       CMP     BYTE PTR [SI],32
                JBE     SET_CARRY
                CMP     BYTE PTR [SI],'/'
                JZ      SET_CARRY
                CLC
                RET
SET_CARRY:      STC
                RET

;-------------------------------------------------;
; This subroutine checks for the switch characters. ;
;-------------------------------------------------;

SWITCH:         MOV     BYTE PTR [SI-1],0       ;Zero in place of /.
                MOV     BL,DS:[SI]              ;Retrieve the character.
                AND     BL,5FH                  ;Capitalize.
                CMP     BL,'P'
                JNZ     CK_CASE
                MOV     PRINT_FLAG,1
CK_CASE:        CMP     BL,'C'
                JNZ     CK_BINARY
                MOV     CASE_FLAG,1
CK_BINARY:      CMP     BL,'B'
                JNZ     END_SWITCH
                MOV     BINARY_FLAG,1
END_SWITCH:     RET

;-------------------------------------------------------;
; This subroutine prints the current drive and directory. ;
;-------------------------------------------------------;

PRINT_DIR:      MOV     SI,OFFSET DIRECTORY     ;Print "Directory "
                CALL    WRITE_STRING
                MOV     AH,19H                  ;Get current drive and display.
                INT     21H
                ADD     AL,'A'
                MOV     DL,AL
                CALL    DISPLAY
                MOV     DL,':'                  ;Add the colon.
                CALL    DISPLAY
                MOV     DL,'\'                  ;And root.
                CALL    DISPLAY
                MOV     SI,OFFSET WORKING_DIR
                MOV     DL,0
                MOV     AH,47H                  ;Get the current directory
                INT     21H                     ; and display.
                CMP     BYTE PTR WORRING_DIR,0
                JZ      END_DIR
                CALL    WRITE_STRING
END_DIR:        RET

;-------------------------------------------------------;
; This is the major subroutine. If a string is to be found, ;
; the file is opened, read and compared with the string.    ;
;-------------------------------------------------------;

READ_FILE:      PUSH    BP                      ;Save the BP; cellar is using it.
                CMP     STRING_FLAG,1           ;If no string, simply display file.
                JZ      BINARY_READ
                JMP     PRINT_FILE
BINARY_READ:    CMP     BINARY_FLAG,1           ;If /B was found open the file
                JZ      OPEN_FILE               ; otherwise, skip EXE and COM files
                CALL    EXE_COM
                JNC     OPEN_FILE
                JNP     RETURN

OPEN_FILE:      MOV     EOF_FLAG,0              ;Reset EOF and MATCH flags.
                MOV     MATCH_FLAG,0
                MOV     DX,OFFSET DTA+30
                MOV     AX,3D00H                ;Open the file for reading.
                INT     21H
                MOV     BX,AX
GET_FILE:       PUSH    BX                      ;Save the file handle for closing.
                MOV     DX,OFFSET FILE
                MOV     CX,63488                ;Attempt to read 63488 bytes.
                MOV     AH,3FH
                INT     21H
                CMP     AX,63488                ;If less then 63488, we got
```

(Figure 1 continues)

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The modem number for PC-IRS is (212) 696-0360. Set your modem and communications software to use 1,200 (or 300) bps, 8 data bits, 1 stop bit, no parity. PC-IRS files with a .COM, .EXE, or .ARC extension require that you also use the Xmodem error-checking protocol; our other files (e.g., with extensions of .ASM or .BAS) can be downloaded using either regular ASCII or Xmodem transmission.

SEARCH.BAS, whether typed in from the magazine or downloaded from PC-IRS, will automatically create SEARCH.COM when run once in BASIC. SEARCH.ASM, also listed both here and on PC-IRS, allows you to modify the program but requires you to use a macro assembler (IBM or Microsoft) and the following commands:

```
MASM SEARCH;
LINK SEARCH;
EXE2BIN SEARCH SEARCH.COM
```

SEARCH AT A GLANCE

Syntax:

```
SEARCH (followed by parameters below)
[d:][path][filename] [string][/P][/C][/e]
```

(continues)

```
                JZ      FILE_END                ; all of the file; flag so.
                MOV     EOF_FLAG,1
FILE_ENO:       CNP     AX,0                    ;If no bytee to read, cloee file.
                JZ      CLOSE_FILE

WORDSTAR:       MOV     CX,AX
                MOV     BX,OFFSET FILE
STRIP:          AND     BYTE PTR DS:[BX],7FH    ;Strip the high bit for WOROSTAR.
                INC     BX
                LOOP    STRIP

                CMP     CASE_FLAG,1             ;If not case seneitive, capitalize.
                JZ      SENSITIVE
                MOV     CX,AX
                MOV     BX,OFFSET FILE
                CALL    CAPITALIZE

SENSITIVE:      CMP     AX,STRING_CT            ;If etring count ie larger than
                JB      CLOSE_FILE              ; file, we are done here.
                MOV     BP,AX                   ;BP will count bytes of file.
                MOV     BX,OFFSET FILE          ;BX will track position in file.
                MOV     DX,STRING_START         ;Store etring atart in DX
                SUB     BP,STRING_CT
                INC     BP
NEXT_BYTE:      MOV     SI,BX                   ;Recover file poeition.
                MOV     DI,DX                   ;Recover etring etert.
                MOV     CX,STRING_CT            ;Get string length.
                MOV     AH,CL                   ;Track delimitere.
LOAO_BYTE:      LOOSB                           ;Get a byte.
                CMP     AL,32                   ;If it ie below epace, ekip.
                JAE     COMPARE
                DEC     AH                      ;Track ekips so not endleee loop.
                JNZ     LOAO_BYTE
                JNP     SHORT NEXT_LOAD
CONPARE:        DEC     AH                      ;Compare with etring.
                SCASB
                JNZ     NEXT_LOAO               ;If no match, move up in file.
NEXT_COMPARE:   LOOP    LOAO_BYTE
                MOV     MATCH_FLAG,1            ;If ell bytee match, flag.
                MOV     LINE_NUM,SI             ;Save poeition in file.
                JMP     SHORT CLOSE_FILE        ;And cloae file.
NEXT_LOAD:      INC     BX                      ;Otherwiee, point to next byte
                OEC     BP                      ;in file end decrement byte counter
                JNZ     NEXT_BYTE               ;and get next byte.

EOF:            CMP     EOF_FLAG,1              ;If we did not get all the file,
                JZ      CLOSE_FILE              ;return for more, otherwise cloee.
                MOV     CX,0FFFFH               ;Bump the file pointer back the
                MOV     DX,STRING_CT            ;lengtb of the file so we will
                NEG     OX                      ;not miea match at the break.
                POP     BX
                MOV     AX,4201N                ;Move pointer vie DOS.
                INT     21H
                JMP     GET_FILE                ;And get more bytes.

CLOSE_FILE:     POP     BX                      ;Recover file handle.
                MOV     AH,3EH                  ;And cloae.
                INT     21H
                CMP     MATCH_FLAG,1            ;if no match, return.
                JNZ     RETURN

PRINT_FILE:     MOV     S1,OFFSET SPACING       ;Indent then diepley the file.
                CALL    WRITE_STRING
                MOV     SI,OFFSET DTA+30
                CALL    WRITE_STRING
                CMP     STRING_FLAG,1
                JNZ     RETURN
                CALL    PRINT_LINE              ;Print line numher match wae found.
RETURN:         POP     BP                      ;Reetore BP
                RET                             ;And return.

;-----------------------------------------;
; Theee two aubroutinee do the dieplaying. ;
;-----------------------------------------;

OISPLAY:        CMP     PRINT_FLAG,1            ;If /P, echo to the printer.
                JNZ     NOT_PRINTER
                MOV     AH,5
                INT     21H
NOT_PRINTER:    MOV     AH,2
                INT     21H
                RET

WRITE_IT:       MOV     DL,AL
                CALL    DISPLAY
WRITE_STNING:   LODSB
                CMP     AL,0                    ;Zero marka end of atring.
                JNZ     WRITE_1T
                RET

;-----------------------------------------;
; Thie eubroutine will cepitalize the file. ;
;-----------------------------------------;
```

(Figure 1 continues)

```
CAPITALIZE:     CMP     BYTE PTR DS:[BX],'a'
                JB      NEXT_CAP
                AND     BYTE PTR DS:[BX],5FH
NEXT_CAP:       INC     BX
                LOOP    CAPITALIZE
                RET

;-------------------------------------------------------;
; This subroutine will check to see it file is .EXE or .COM. ;
;-------------------------------------------------------;

EXE_COM:        MOV     SI,OFFSET DTA+30        ;Point to filename.
EXTENSION:      LODSB                           ; and search for dot.
                CMP     AL,0                    ;If zero, end of filename.
                JZ      NOT_BINARY
                CMP     AL,'.'
                JNZ     EXTENSION
                MOV     AX,SI                   ;Save extension pointer.
                MOV     DI,OFFSET EXE           ;Compare first with EXE
                MOV     CX,3
                REP     CMPSB
                JZ      BINARY
                MOV     SI,AX
                MOV     DI,OFFSET COM           ;Then compare with COM
                MOV     CX,3
                REP     CMPSB
                JZ      BINARY
NOT_BINARY:     CLC                             ;Return with no carry ie no match.
                RET
BINARY:         STC                             ;Return with carry is match.
                RET

;-------------------------------------------------------------------------;
; This subroutine will calculate and display the line number for each match. ;
;-------------------------------------------------------------------------;

PRINT_LINE:     XOR     BH,BH                   ;Get the cursor position to see
                MOV     AH,3                    ; if need to add a tab character
                INT     10H                     ; to format the display.
                CMP     DL,7                    ;If column 8 or less, add tab.
                JA      NO_TAB
                MOV     DL,9
                CALL    DISPLAY
NO_TAB:         MOV     SI,OFFSET LINE          ;Display "Line number "
                CALL    WRITE_STRING
                MOV     CX,LINE_NUM             ;Retrieve offset into file to
                SUB     CX,OFFSET FILE          ; calculate the number of bytes
                MOV     SI,OFFSET FILE          ; to look for carriage returns.
                MOV     BX,1                    ;Start at line one.
CK_LINE:        LODSB
                CMP     AL,13                   ;Count the carriage returns.
                JNZ     NEXT_LINE
                INC     BX
NEXT_LINE:      LOOP    CK_LINE

                MOV     DISPLAY_FLAG,0          ;Reset the display flag.
TENTHS:         MOV     CX,10000                ;Get ten thousands by dividing.
                CALL    DIVIDE
                MOV     CX,1000                 ;Get thousands by dividing.
                CALL    DIVIDE
                MOV     CX,100                  ;Get hundreds by dividing.
                CALL    DIVIDE
                MOV     CX,10                   ;Get tens by dividing.
                CALL    DIVIDE
                MOV     CX,1                    ;Get ones by dividing.
                CALL    DIVIDE
                RET

DIVIDE:         MOV     AX,BX                   ;Number in AX
                XOR     DX,DX                   ; and zero in DX
                DIV     CX                      ; divide by CX
                MOV     BX,DX                   ; remainder into BX
                MOV     DL,AL                   ; and quotient into DL.
                CMP     AL,0                    ;Is it zero?
                JZ      FLAG                    ;If yes, is a non zero displayed?
                OR      DISPLAY_FLAG,AL         ;If non zero indicate by flag.
FLAG:           CMP     DISPLAY_FLAG,0          ;Has there been a display?
                JZ      END_LINE                ;If no, return.

DISP_NUMBER:    ADD     DL,30H                  ;Convert hexadecimal to decimal
                CALL    DISPLAY                 ;And display.
END_LINE:       RET


SUBSCRIPTS:
CURRENT_DIR     EQU     SUBSCRIPTS+100
WORKING_DIR     EQU     CURRENT_DIR+64
DTA             EQU     WORKING_DIR+64
FILE            EQU     DTA+65
CODE ENDS
END  START
```

(Figure 1 ends)

"SEARCH AT A GLANCE" (continued)

Operation: SEARCH will find either filenames or strings, as requested. The default is a diskwide search that includes all subdirectories; the more parameters you add, the narrower the search will be. Filenames can include DOS wildcards, and string searches will report the line number of the first match. Search strings must be enclosed in quotes.

The /P switch echoes all the output to a printer.

The /C switch is a case-sensitive/case-insensitive toggle.

The /B switch adds binary files to those in which a string-search is being made.

Ctrl-Break or Ctrl-C terminates SEARCH.

the directories instead of the files.

Here, there are two problems to handle. When we ask for directory entries, DOS not only returns directories but normal files as well. Also, those mysterious files "." and ".." are returned. The latter problem is used to our advantage a little later on. SEARCH looks at the attribute of the returned match, and if it is found to be other than a directory or if the first character is a dot, it is ignored. If a directory is found, we change to that directory, a pointer is incremented to track our level in the tree, and a subscript of that level is incremented to keep track horizontally of where we are in the subdirectory. All matching filenames are found in that directory and the process continues until we come to a dead end in the current path. We then back up one directory by changing the directory to "..". (This is the file that DOS uses to keep the info on what the parent directory is.) It's like trailblazing in the forest. This search is continued until no more subdirectories are found. To illustrate, let's trace the path SEARCH will take in Figure 3.

TREE-STRUCTURED SEARCHES

After first finding all the files in the root, we go to WS and find those files. Since we have come to a dead end, next we go to 123 and find those files. We proceed to

■ PROGRAMMING/UTILITIES

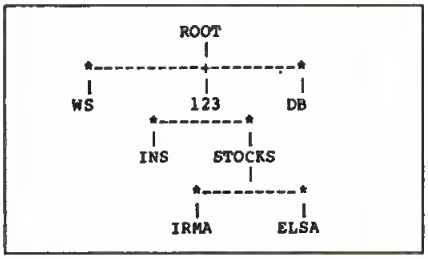


Figure 3: *The tree-structured directory example used in the text to illustrate the operation of SEARCH.COM.*

INS and do the same. This again is a dead end, so we back up and find the next subdirectory, STOCKS. After finding these files, we go on to IRMA. We then back down to STOCKS and up to ELSA. This time when we back down to STOCKS, we find no more subdirectories. So we back down to 123 and have the same results. Again we back down, arriving at the root, and then proceed to DB. After we search through DB for its files, we once again return to the root, only to find there are no more subdirectories. Therefore, we've successfully touched all bases, and the search shown in Figure 3 is terminated.

When a matching filename is found, the READ_FILE subroutine is called upon. If no string is found in the command line, the matching filename is displayed (02h). If the /P is found, the display is sent to the printer (05h). We then return for the next search.

If a string needs to be matched, however, the first thing the READ_FILE routine does is to check if files with .EXE or .COM are to be included. If not, we are simply returned for the next search without displaying the file. Otherwise, the file is opened (3Dh) and function 3Fh is used to request that 63,488 (248*256) bytes be read. I kept the number of bytes to be read at any one time under 64K and made it a multiple of 256, the DOS buffer size. If the full 63,488 bytes are read, we take note of it so that we can return for the balance of the file; otherwise, it is assumed that we have read the entire file. Next, the high bit that is present in WORDSTAR files is stripped by ANDing with 7Fh. If the search is not to be case sensitive, the file is capitalized by ANDing with 5Fh (as was done with the specified string in the command line while it was being parsed).

```
100 REM -- BASIC PROGRAM TO CREATE SEARCH.COM
110 OPEN "SEARCH.COM" AS #1 LEN = 1
120 FIELD #1,1 AS A$
130 CHECKSUM = 0
140 FOR I = 1 TO  161
150    LINESUM = 0
160    FOR J = 1 TO 8
170       READ BYTE
180       CHECKSUM = CHECKSUM + BYTE
190       LINESUM = LINESUM + BYTE
200       IF (BYTE < 256) THEN LSET A$ = CHR$(BYTE)
210       PUT #1
220    NEXT J
230    READ LINECHECK
240    IF LINECHECK <> LINESUM THEN PRINT "Error in Line";280 + 10 * I
250 NEXT I
260 CLOSE
270 IF CHECKSUM = 121600 THEN PRINT "Successful Completion!" : END
280 PRINT "COM file is not valid!" : END
290 DATA    233,    167,      0,     67,    111,    112,    121,    114,    925
300 DATA    105,    103,    104,    116,     32,     49,     57,     56,    622
310 DATA     54,     32,     90,    105,    102,    102,     32,     68,    585
320 DATA     97,    110,    105,    115,     32,     80,    117,     98,    762
330 DATA    108,    105,    115,    104,    105,    110,    103,     32,    782
340 DATA     67,    111,     46,     26,     77,    105,     99,    104,    635
350 DATA     97,    101,    108,     32,     74,     46,     32,     77,    567
360 DATA    101,    102,    102,    111,    114,    100,     64,      1,    695
370 DATA     42,     46,     42,      0,     92,      0,     46,     46,    314
380 DATA      0,      0,      0,      0,      0,      0,      0,      0,      0
390 DATA      0,      0,      0,      1,      0,      0,      0,      0,      1
400 DATA      0,      0,      0,      0,      0,     69,     88,     69,    226
410 DATA     67,     79,     77,     73,    110,    118,     97,    108,    729
420 DATA    105,    100,     32,    112,     97,    114,     97,    109,    766
430 DATA    101,    116,    101,    114,    115,      7,     36,     13,    603
440 DATA     10,     83,    101,     97,    114,     99,    104,    105,    713
450 DATA    110,    103,     32,    102,    111,    114,     32,      0,    604
460 DATA     13,     10,     13,     10,     68,    105,    114,    101,    434
470 DATA     99,    116,    111,    114,    121,     32,      0,      9,    602
480 DATA     76,    185,    110,    101,     32,    110,    117,    109,    760
490 DATA     98,    101,    114,     32,      0,     13,     10,     32,    408
500 DATA     32,      0,    252,    176,      1,    185,    100,      0,    746
510 DATA    191,      7,      6,    243,    170,    180,     25,    205,   1027
520 DATA     33,    162,     73,      1,    190,    108,      6,    178,    751
530 DATA      0,    180,     71,    205,     33,    186,    235,      6,    916
540 DATA    232,     43,      2,    128,     62,    128,      0,      0,    595
550 DATA    119,      3,    233,    119,      1,    190,    130,      0,    795
560 DATA    172,     60,     32,    116,    251,     60,     34,    117,    842
570 DATA      3,    233,    214,      0,     60,     13,    117,      3,    643
580 DATA    233,     87,      1,    120,     60,     50,    117,     24,    710
590 DATA     36,     95,     44,     65,    130,    200,    180,     14,    780
600 DATA    205,     33,     70,    232,      7,      2,    114,     50,    713
610 DATA    172,     60,     34,    117,      3,    233,     68,      1,    608
620 DATA    137,     54,     76,      1,    255,     14,     76,      1,    614
630 DATA    137,     54,     74,      1,    255,     14,     74,      1,    610
640 DATA    255,     14,     74,      1,     60,     92,    117,     20,    633
650 DATA    186,     68,      1,    232,    203,      1,    100,      6,    895
660 DATA     86,      1,      1,    255,      6,     76,      1,    232,    658
670 DATA    211,      1,    114,    112,     60,     42,    117,     13,    670
680 DATA    172,     60,     46,    116,      3,    233,     12,      1,    643
690 DATA    172,     60,     42,    116,     95,     60,     47,    117,    709
700 DATA     10,    232,    199,      1,     60,     34,    117,      3,    656
710 DATA    233,    249,      0,    172,     60,     32,    118,     19,    883
720 DATA     60,     92,    117,    233,    198,      6,     86,      1,    793
730 DATA      1,    137,     54,     74,      1,    255,     14,     74,    610
740 DATA      1,    235,    218,    138,    216,    198,     68,    255,   1329
750 DATA      0,    198,      6,      0,      7,      0,    139,     22,    372
760 DATA     76,      1,    185,     16,      0,    232,    123,      1,    634
770 DATA    128,     62,      0,      7,     16,    117,     15,    100,    543
780 DATA      6,     86,      1,      1,    137,     54,     74,      1,    360
790 DATA    255,     14,     74,      1,    235,      0,    130,     22,    740
800 DATA     74,      1,     66,    137,     22,     62,      1,    128,    491
810 DATA    251,     13,    116,     94,    172,     60,     32,    116,    854
820 DATA    251,     60,     47,    117,      5,    232,     89,      1,    812
830 DATA    235,    242,     60,     13,    116,     76,     60,     34,    836
840 DATA    117,    234,    198,      6,     85,      1,      1,    137,    779
850 DATA     54,     79,      1,     50,    255,    138,     30,    128,    735
860 DATA      0,    129,    195,    129,      0,     75,    128,     63,    719
870 DATA     34,    116,      6,     59,    222,    116,    117,    235,    905
880 DATA    244,    198,      7,      0,     83,     43,    222,    137,    934
890 DATA     30,     81,      1,     94,    172,     60,     47,    117,    602
900 DATA      3,    232,     30,      1,     60,     13,    117,    244,    700
910 DATA    128,     62,     80,      1,      1,    116,     11,    139,    546
920 DATA     14,     81,      1,    139,     30,     79,      1,    232,    577
930 DATA     97,      2,    198,      6,     78,      1,      1,    128,    511
940 DATA     62,     85,      1,      1,    117,     13,    100,    119,    588
950 DATA      1,    232,     73,      2,    139,     54,     79,      1,    581
960 DATA    232,     66,      2,    128,     62,     86,      1,      1,    578
970 DATA    117,     97,    139,     30,     74,      1,    198,      7,    663
980 DATA      0,    139,     22,     76,      1,    232,    193,      0,    663
990 DATA    232,      8,      1,    139,     22,     62,      1,    185,    650
```

(continues)

Figure 4: *A BASIC program that will create SEARCH.COM.*

```
1000 DATA    6,    0,  232,  100,    0,  114,   13,  232,  707
1010 DATA   40,    1,  232,  107,    0,  114,    5,  232,  811
1020 DATA   32,    1,  235,  246,  130,   22,   73,    1,  748
1030 DATA  180,   14,  205,   33,  186,   60,    1,  120,  815
1040 DATA   62,  107,    6,    0,  116,    0,  190,    6,  503
1050 DATA  107,    6,   92,  186,  107,    6,  232,  136,  872
1060 DATA    0,  178,   13,  232,  210,    1,  178,   10,  830
1070 DATA  232,  213,    1,  120,   62,   70,    1,    1,  716
1080 DATA  116,    7,  186,   80,    1,  100,    9,  205,  803
1090 DATA   33,  205,   32,  186,   60,    1,  232,  104,  861
1100 DATA    0,  189,    7,    6,  232,  172,    0,  139,  745
1110 DATA   22,   62,    1,  185,    6,    0,  232,   90,  606
1120 DATA    0,  114,   31,  232,  204,    0,  232,   95,  908
1130 DATA    0,  114,   23,  232,  196,    0,  235,  246, 1046
1140 DATA  129,  253,    7,    6,  116,  150,  186,   70,  925
1150 DATA    1,  232,   61,    0,   62,  190,   70,    0,  624
1160 DATA    1,   77,   50,  219,  186,   64,    1,  185,  783
1170 DATA   16,    0,  232,   54,    0,  114,  225,  120,  760
1180 DATA   62,    0,    7,   16,  117,   20,  120,   62,  420
1190 DATA    9,    7,   46,  116,   21,  254,  195,   62,  710
1200 DATA   50,   94,    0,  117,   13,   62,  254,   70,  668
1210 DATA    0,  186,    9,    7,  232,   10,    0,   69,  513
1220 DATA  235,  162,  232,   19,    0,  114,  185,  235, 1102
1230 DATA  214,  180,   59,  205,   33,  195,  100,   26, 1092
1240 DATA  205,   33,  195,  100,   70,  205,   33,  195, 1124
1250 DATA  180,   70,  205,   33,  195,  128,   60,   32,  912
1260 DATA  110,    7,  120,   60,   47,  116,    2,  240,  726
1270 DATA  195,  249,  195,  190,   60,  255,    0,  130, 1208
1280 DATA   20,  120,  227,   95,  120,  251,   80,  117, 1054
1290 DATA    5,  190,    6,   87,    1,    1,  120,  251,  677
1300 DATA   67,  117,    5,  190,    6,   80,    1,    1,  483
1310 DATA  120,  251,   66,  117,    5,  190,    6,   89,  860
1320 DATA    1,    1,  195,  100,  136,    1,  232,   20,  784
1330 DATA    1,  100,   25,  205,   33,    4,   65,  130,  651
1340 DATA  200,  232,  252,    0,  170,   50,  232,  247, 1407
1350 DATA    0,  170,   92,  232,  242,    0,  190,  171, 1105
1360 DATA    6,  170,    0,  100,   71,  205,   33,  120,  801
1370 DATA   62,  171,    6,    0,  116,    3,  232,  244,  834
1380 DATA    0,  195,   85,  120,   62,   85,    1,    1,  557
1390 DATA  116,    3,  233,  107,    0,  120,   62,   89,  816
1400 DATA    1,    1,  116,    0,  232,  240,    0,  115,  713
1410 DATA    3,  233,  194,    0,  190,    6,   90,    1,  725
1420 DATA    0,  190,    6,   91,    1,    0,  186,    9,  491
1430 DATA    7,  184,    0,   61,  205,   33,  139,  216,  845
1440 DATA   83,  186,   44,    7,  185,    0,  240,  100,  933
1450 DATA   63,  205,   33,   61,    0,  240,  116,    5,  731
1460 DATA  190,    6,   90,    1,    1,   61,    0,    0,  357
1470 DATA  116,  114,  130,  200,  107,   44,    7,  120,  935
1480 DATA   30,  127,   67,  226,  250,  120,   62,   80,  907
1490 DATA    1,    1,  116,    0,  139,  200,  107,   44,  696
1500 DATA    7,  232,  151,    0,   59,    6,   81,    1,  537
1510 DATA  114,   82,  139,  232,  107,   44,    7,  139,  944
1520 DATA   22,   79,    1,   43,   46,   81,    1,   69,  342
1530 DATA  139,  243,  130,  250,  139,   14,   81,    1, 1006
1540 DATA  130,  225,  172,   60,   32,  115,    6,  254, 1002
1550 DATA  204,  117,  247,  235,   18,  254,  204,  174, 1453
1560 DATA  117,   13,  226,  230,  190,    6,   91,    1,  890
1570 DATA    1,  137,   54,   83,    1,  235,   20,   67,  607
1580 DATA   77,  117,  213,  120,   62,   90,    1,    1,  689
1590 DATA  116,   18,  185,  255,  255,  139,   22,   81, 1071
1600 DATA    1,  247,  210,   01,  184,    1,   66,  205, 1013
1610 DATA   33,  233,  116,  255,   91,  180,   62,  205, 1175
1620 DATA   33,  120,   62,   91,    1,    1,  117,   22,  455
1630 DATA  190,  165,    1,  232,   39,    0,  190,    9,  826
1640 DATA    7,  232,   33,    0,  120,   62,   85,    1,  548
1650 DATA    1,  117,    3,  232,   81,    0,   93,  195,  722
1660 DATA  120,   62,   87,    1,    1,  117,    4,  100,  500
1670 DATA    5,  205,   33,  100,    2,  205,   33,  105,  858
1680 DATA  130,  200,  232,  235,  255,  172,   60,    0, 1300
1690 DATA  117,  246,  195,  120,   63,   97,  114,    3,  963
1700 DATA  120,   39,   95,   67,  226,  245,  195,  190, 1185
1710 DATA    9,    7,  172,   60,    0,  116,   20,   60,  452
1720 DATA   46,  117,  247,  139,  190,  191,   03,    1, 1032
1730 DATA  185,    3,    0,  243,  166,  116,   14,  139,  866
1740 DATA  240,  101,   06,    1,  105,    3,    0,  243,  850
1750 DATA  166,  116,    2,  240,  195,  249,  195,   50, 1221
1760 DATA  255,  100,    3,  205,   16,  120,  250,    7, 1044
1770 DATA  110,    5,  170,    9,  232,  161,  255,  190, 1149
1780 DATA  151,    1,  232,  176,  255,  130,   14,   83, 1051
1790 DATA    1,  129,  233,   44,    7,  190,   44,    7,  655
1800 DATA  107,    1,    0,  172,   60,   13,  117,    1,  551
1810 DATA   67,  226,  240,  190,    6,   92,    1,    0,  830
1820 DATA  105,   16,   39,  232,   25,    0,  185,  232,  914
1830 DATA    3,  232,   19,    0,  105,  100,    0,  232,  771
1840 DATA   13,    0,  105,   10,    0,  232,    7,    0,  447
1850 DATA  105,    1,    0,  232,    1,    0,  195,  139,  753
1860 DATA  195,   51,  210,  247,  241,  139,  210,  130, 1439
1870 DATA  200,   60,    0,  116,    4,    0,    6,   92,  494
1880 DATA    1,  120,   62,   92,    1,    0,  116,    6,  406
1890 DATA  120,  194,   40,  232,   66,  255,  195,    0, 1110
```

(Figure 4 ends)

Now it's time to search for a match. This part of the routine can be found in the assembly listing between the labels SENSITIVE and EOF. It is not many instructions long relative to the rest of the code, but it is a nested loop that will be iterated millions of times. I therefore tried to make it as efficient as possible. A fetch from memory is obviously going to take more time than it would if the information is already in the microprocessor, so the registers are used instead of memory locations for storage of the pointers in the file and the string. A MOV reg,reg (register to register) move takes only 2 clock cycles, as opposed to the 15 cycles taken for the MOV reg,mem (memory to register) move—a significant saving.

The search for a match is like an inch worm creeping along a byte at a time. If a character below the ASCII code for a space (e.g., the carriage return and linefeed characters) is encountered, it is skipped. This ensures matches across line breaks. If a match is found, the search is terminated and the position in the file is noted. The filename is then sent to the display. If no match is found, and the file is bigger than 63,488 bytes, the read/write pointer is moved back (42h) by the number of bytes in the match string, and the balance of the file is read. Otherwise, the file is closed (3Eh).

This brings us to the last subroutine, PRINT_LINE. The line number is determined by counting the number of carriage returns from the start of the file to the current position. The number is converted from hex to decimal, and leading zeros are suppressed. I wanted all the line numbers to be displayed in column 16. This is the equivalent of two horizontal tabs (character 9). After the filename is displayed, the current cursor position is retrieved via INT 10h, function 3. If the cursor is found in column 7 or below, two tabs are sent; if in column 8 or above, one tab is sent. Upon receiving the tab(s), DOS kindly formats the text for us.

I'm sure you'll find more uses for SEARCH than I have illustrated here. Happy hunting.

Michael J. Mefford, a consultant in Gleneden Beach, Oregon, is a frequent contributor to PC Magazine.

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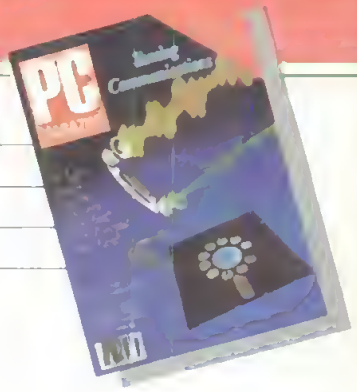
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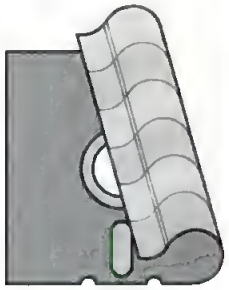
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■ JARED TAYLOR

SPREADSHEET CLINIC



More solutions to the range-renaming problem; new uses for @cellpointer; centering lines in 1-2-3; and making screen blanking easier.

RENAMING RANGES

I sometimes find it desirable to rename a *1-2-3* range that I have already created. There is no direct command that does this, so I wrote macro \R in Figure 1. It works by creating a new range that is identical (except for its name) to an existing range, and deletes the old range. In Figure 1, cell E9 must be given the name MESSAGES. Don't forget to include all the text at MESSAGES; otherwise the macro is too confusing to use.

The macro prompts you three times: once for the new range name and twice for the old name. The second prompt for the old name lets the macro delete it, so if you want the same range to have more than one name, hit Esc at the last prompt, and the old name will not be deleted.

It would be more convenient not to have to enter the same thing twice, so I tried to figure out a way to capture the string input for the second {?} and pass it to the third {?}. I couldn't, but the macro is still useful.

Rose Strain
Davie, Florida

Ms. Strain's macro incorporates several clever features. The sequence for creating and deleting a range is about as economical as you can get. Also, by sending the cursor to MESSAGES and then sending it {down}, the macro puts its instructions in the control panel—right where you need them. That's something I've not seen before.

I have written another macro, \B, that does the same job as \R, but you need to enter the names of the old and new ranges only once. It thus does a little more work for you, but you don't have the option of hitting Esc to leave the range with more than one name. The macro then takes you to a cell just to the left of the new range so you can delete the old label—assuming you consistently label your ranges in the cells to the left.

CELL TEST MACROS

In the Spreadsheet Clinic of September 16, 1986 (Volume 5 Number 15), there is an item called "The Backspace Disaster" that points out some of the problems involved in using macros in *1-2-3*, Release 1A, to test the contents of a column of cells. The specific problem discussed was the use of /rncCELL~{bs}~ to name a cell. The value of CELL is tested, and, depending on the results, the macro moves to the cell below, deletes the range name CELL, names the next cell CELL, and continues until it finds a target value. The trouble with this method is that any formula in the worksheet that referred to the original cell that was named CELL now refers to the latest cell named CELL.

The solution proposed in that submission was the two-line macro, \T, reproduced in Figure 2. This is a good solution in Release 1A, but in Release 2.0 you can do the same job much more quickly and without the risk of setting up unintended

```
        C              E                    F
-------------------------------------------------------------------
 3  \R          {goto}MESSAGES~
 4              /rnc{?}~{bs}{name}{?}~{down}
 5              /rnd{?}~
 6              /xq
 7
 8
 9  MESSAGES    On LEFT, enter NEW rangename.  On RIGHT, enter OLD rangename
10              NOW enter OLD name to be deleted . . .
11
12
13      *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
14
15  \B          /xlEnter new range name:  ~NEW~
16              /xlEnter old name:  ~OLD~
17              /cOLD~OLD2~/cNEW~NEW2~
18              /rnc
19  NEW
20              ~{bs}
21  OLD
22              ~/rnd
23  OLD2
24              ~{goto}
25  NEW2
26              ~{left}
```

Figure 1: *Two macros that let you change range names.*

■ SPREADSHEET CLINIC

```
     \T  /rncCELL~{BS}~
   1 \S  /rndCELL~/rncCELL~~/xiCELL<>999~{down}~/xg\S~          Delete "CELL", name current cell "CELL";
   2                                                            if CELL = 999, etop;
   3                                                            otherwise, down and rapeat cycla.
     \X  {if @cellpointar("contente")<>999}{down}{BRANCH \X}~  If valua of cureor cell = 999 atop:
   5                                                            otharwise, down and repeat cycla.
   6 \Y  {if @cellpointar("contente")="END"}{QUIT}             If cursor call holde word "END", atop;
   7     {down}{BRANCH \Y}~                                     otherwise, down and repeat cycle.
   8
   9 \Z  {if @cellpointer("type")<>"b"}{down}{BRANCH \Z}~      If cureor cell ie blank, etop;
 999                                                            otherwise, down end repeat cycle.
 END \M  {if @callpointar("type")="b"}{?}                     If cursor cell ie blenk, peuea,
         {if @cellpointar("contenta")="END"}{QUIT}              accept input with <Entar>.  If cursor
         {down}{BRANCH \M}~                                     call ie "END", etop;
                                                                otherwise, down and repeat cycle.
```

Figure 2: *A series of macros that make decisions based on cell contents.*

cell references. Instead of naming each cell as the cursor reaches it, use the @cellpointer(attribute) function. If you replace macro \T with \X you get exactly the same results, except that there is no range named CELL when you're finished. Moreover, \X has no effect on any named cells it passes through (the problem addressed by the earlier submission), and it works about ten times as fast.

The remaining macros in Figure 2, \Y, \Z, and \M, demonstrate the flexibility of the @cellpointer function. \Y stops when it finds the specific label END, in a cell, and \Z stops when it finds a blank cell. \M combines \Y and \Z. The macro stops when it finds a blank cell. You can fill it with data (or not), hit Enter, and the macro continues until it reaches END. The column of numbers along the left-hand edge of Figure 2 is a good test column for all these macros.

Note that even in Release 2.0 you can use /xg instead of {branch}, but that will slow down macro execution. The macros also seem to run a little more slowly when testing for a value (\X) rather than a string (\Y).

R. S. Roberts
Denver, Colorado

A number of @cellpointer applications have already appeared in this column, but it's instructive to have a specific demonstration of the function's flexibility.

CENTERING TEXT

I'm fussy about how my *1-2-3* spreadsheets look, and I like to center text on the screen, as shown in the lower part of Figure 3. I was eternally fiddling with the spacing until I wrote macros to do the job. If you run macro \C in Figure 4, with the cursor on a label, the label will be centered. The macro works by changing the column width to 72 and centering the label. It then prints the label to a disk file, imports it back into the spreadsheet, erases the disk file, and resets the column width. The result of all this is that the label is entered into a column of normal width, but with just enough additional leading spaces to center it.

Before you run this macro, make sure you don't have a file named CENTER .PRN on your disk. Also, be sure that you are centering labels and not values. That's important because this macro turns everything into labels. Finally, if you have set the column width of the label to anything other than the default width, you will have to reset it by hand.

Macro \S will center several rows of labels when the cursor is on the label in the first row. Since it uses {end} {down}, don't use this macro unless there is a blank line below the last line you want centered. Macro \C is safer.

Doris deLespinasse
Adrian, Michigan

```
CENTER THIS CENTER THIS
CENTER THIS CENTER THIS CENTER THIS
CENTER THIS CENTER THIS CENTER THIS CENTER THIS
CENTER THIS CENTER THIS CENTER THIS CENTER THIS AND THIS
AND THIS
|
|
|


                    CENTER THIS CENTER THIS
               CENTER THIS CENTER THIS CENTER THIS
          CENTER THIS CENTER THIS CENTER THIS CENTER THIS
     CENTER THIS CENTER THIS CENTER THIS CENTER THIS AND THIS
                                AND THIS
                                   |
                                   |
                                   |
```

Figure 3: *Text, before and after running macro \S.*

```
\C      /wca72~
        /rlc~
        /pfCENTER~caer~oml@~mt@~ouqgq
        /fitCENTER~
        /fepCENTER~y
        /wcr


\S      /wce72~
        /rlc.{end}{down}~
        /pfCENTER~caar.{end}{down}~oml@~mt@~ouqgq
        /fitCENTER~
        /fepCENTER~y
        /wcr
```

Figure 4: *Two macros that center text.*

■ SPREADSHEET CLINIC

In spite of all the centering, writing, and erasing this macro does, it works surprisingly fast. You'd think that the labels you want centered have to be at the left of the screen, but that's not so. They'll end up in the middle no matter where they started. Of course, if they were over to the right, everything else would have shifted to the left. . . .

These are fine little macros that work with all versions of 1-2-3.

```
\M          {off} . . .
            . macro . . .
            . . continues . .
            . . . here . . .
            {on}

OFF         {indicate PAUSE}{paneloff}{windowsoff}

ON          {indicate}{panelon}{windowson}
```

Figure 5: *Subroutines that handily turn screen updating on and off.*

BLANKING THE SCREEN

As previous contributors to Spreadsheet Clinic have pointed out, it is very handy in *1-2-3*, Release 2.0, to be able to turn off both the screen and the control panel during macro operation. Execution is faster and screen appearance is more professional. As a final touch, you can use the {indicate} function to put a message in the upper-right-hand corner of the screen.

However, if you have to switch often between the two modes, it's a chore to have to write {panelon} {paneloff} continually into your macros. The easy way to get around that is to write two little subroutines, as in Figure 5. This way, whenever you want to turn the screen off, just type {off} into a macro; {on} turns the screen back on.

Bruce Theriault
Seven Mile, Ohio

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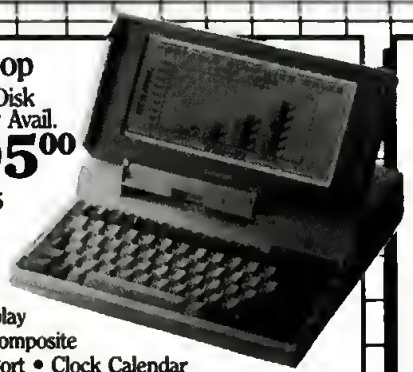
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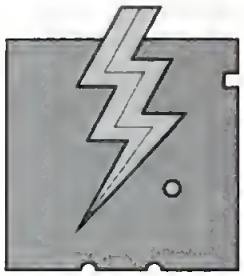


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■ EDITED BY CRAIG L. STARK



POWER USER

Adding CLEAR TO to Clipper; deleting dBASE memo fields; finding a good use for outliners; hidden text tricks in Word; more notes on SideKick's notepad.

CLEARING WITH CLIPPER

The *dBASE* CLEAR TO command, which clears a rectangular section of the screen, is especially useful for blanking out a screen area for menus, boxes, etc. Unfortunately, this feature is not supported by Nantucket's excellent *Clipper Compiler*.

However, *Clipper*'s BOX command offers a solution to the problem. To draw a box with *Clipper*, you specify the coordinates of the four corners and the eight ASCII characters to be used for the four corners and four sides. If you add an optional ninth character, *Clipper* will fill the inside of the box with it. If this ninth character is CHR(32), the ASCII space, the interior of the box is cleared.

If all nine characters are specified as CHR(32), the corners and sides will be duly drawn with spaces and the ninth CHR(32) will fill the area. Thus, for example, what in *dBASE III* would be

```
@ 2,20 CLEAR TO 6,59
```

simply becomes

```
@ 2,20,6,59 BOX REPLICATE(CHR(32),9)
```

in *Clipper*'s instructions.

Stephen G. Goldberg, M.A.
Logan, Utah

Perfect one-liners are beautiful, whether a joke or a line of code. Until Mr. Goldberg's submission, I'd been using the rather klutzy workaround

```
x=2
DO WHILE x<6
   @ x,20 SAY SPACE(40)
   x=x+1
ENDDO
```

It's almost obscene to write five lines of code when one line will do the trick. Mr. Goldberg has done his part for the "Paper Reduction Act"!—Brad Stark

MEMO FIELD DIET PLAN

If you're working with a database that contains a memo field, the normal *dBASE III* delete/pack commands will remove a record from the .DBF file, but the space used by the associated .DBT memo file is not removed. The problem is magnified when there is a lot of append/delete activity in your file. Your .DBT file gets like my attic—stuff goes in but nothing ever comes out again!

There is one way to remove the deleted memo space, however, and that is by using *dBASE*'s COPY TO command. Figure 1 shows a typical command sequence. Remember that any indexes associated with your file will have to be rebuilt.

Dan Domzalski
Buffalo Grove, Illinois

If you use dBASE *memo fields, this is good news—especially if you save files on floppies. You could be wasting time and disk space right now, dutifully backing up trash memos connected with records you deleted long ago.*

I've always felt that Ashton-Tate's implementation of memo fields is half-hearted at best, especially when compared with the splendid TBMS (text-based management systems) available today (see "TBMS: Database Power Unleashed" in PC Magazine, *Volume 5 Number 20).* dBASE *users deserve better.*—Brad Stark

```
USE <filename>
COPY TO temp FOR .NOT. DELE()
ERASE <filename.dbf>
ERASE <filename.dbt>
RENAME temp.dbf TO <filename.dbf>
RENAME temp.dbt TO <filename.dbt>
```

Figure 1: *Recopying the file is the only way to recapture disk space from obsolete memo fields in* dBASE.

HIDING WITH STYLE

Microsoft Word uses hidden text to mark index and table of contents entries. When these are formatted using keyboard formatting, both are treated the same way. Using "Esc, Window, Option, Show hidden text, Yes" shows all hidden text, including index entries and table of contents entries. This forces you to sift through both kinds of entries even if you only want to edit one kind.

If these marking strings are formatted as hidden text using the style sheet, however, you can create a different format command for each kind of entry. Then, when you want to edit one or the other, you can change that style definition to be visible on the style sheet, and the other kind of entry will remain invisible.

Ronny Richardson
Chamblee, Georgia

I don't use indexes or tables of contents frequently, but I've been doing something similar with hidden text in Word. *Some of*

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my hidden text represents edits that may be restored. Other hidden text contains notes to myself—reminding me where I got information, or whether a particular statement needs confirmation. By defining three different kinds of hidden text in my style sheet, I've effectively created three different kinds of hidden text, any one of which can be made visible independently of the others. The nice thing about style sheets is that you can define as many different kinds of hidden text as you need, so that Mr. Richardson's trick and my trick can both be used simultaneously.
—M. David Stone

ZERO ZAPPER

When downloading data from other systems (especially from mainframes), it is not unusual to find numeric fields packed with leading zeros. If the imported *dBASE* field is numeric, this is not a major problem, though it's awkward to read numbers preceded by zeros; and, when any *dBASE* operation is performed on them, *dBASE* strips them without even being asked.

But when you want the import field to be a character type, real problems arise. Indexes get skewed because the leading zeros don't index the same as leading spaces. We used to spend hours stripping these meaningless ciphers manually, but there is a better way:

To strip leading zeros from numeric fields,

```
REPL ALL <fieldname> WITH <fieldname>
```

Character fields are more complicated. Assuming that the field being stripped is called Fld:

```
SET CONS OFF
DO WHIL .NOT. EOF()
   x=1
   DO WHIL "0"=SUBS(Fld,x,1).AND.x<LEN(Fld)
      x=x+1
   ENDDO
   REPL Fld WITH REPL(" ",x-1)+SUBS(Fld,x)
   SKIP
ENDDO
SET CONS ON
```

David T. Dodson
Fort Wayne, Indiana

Because it employs the REPLicate function, Mr. Dodson's program will work only with dBASE Plus. *If you're using an earlier* dBASE *version, STOR a string of spaces with the same length as your target field before entering the first DO WHIL loop. Then, instead of the line containing the REPLicate function, substitute:*

```
REPL Fld WITH SUBS(slug,1,x-1)+SUBS(Fld,x)
```

Actually, if the character field to be stripped contains only *numeric characters, the leading zeros can be stripped with one command line. Assuming again that the field in question is called Fld and that its length is 8,*

```
REPL ALL Fld WITH STR(VAL(Fld),8)
```

One word of caution: I have encountered mainframe data that not only fills in leading zeros, but also substitutes an alpha character among the numerics to indicate a negative value. Before using any of the above routines, make sure the imported numerics are all *numeric—otherwise your data will be corrupted.*

If you do encounter alpha characters mixed into the numeric data, the fix is a hassle and should be attempted only if you know what you're doing. It's weird to look at a freshly imported number-type field and see an alpha here and there. You know it can't *possibly be there—but it is. You know* dBASE *can't possibly put up with this nonsense—and you're right again.*

The steps to rescue this kind of data are as follows:

1. Restructure your dBASE *import file so that all the fields are character-type. Add an extra 1-byte flag field for each numeric where there are alpha characters. Then (with appropriate grumbling and a few choice words) reimport the raw data.*

2. Mark the flag field where an alpha exists in the numeric data. If there aren't too many records, a visual scan may suffice. Otherwise, you'll need to write a short procedure to examine each byte, marking the flag field each time it hits something other than a number, space, or numeric sign.

3. Determine from the mainframe operator what the blasted code is—for example, that an A in the number stream means −1 and B means −2.

4. Correct the data. Personally, I like to use BROWse if there aren't too many corrections, setting a filter to see only the flagged records. Otherwise, another routine will be required to STUFF in the replacement number.

5. Then

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■ POWER USER

```
REPL ALL Fld WITH -1*Fld
```

for flagged fields.

6. As a last step, you might ask the mainframe operator if he can format his output differently next time. And you can judge what kind of person he is by whether he answers "Sure" or "Gee, I don't think we can do that."—Brad Stark

GRAPHIC SHORTCUT

While designing a screen display with *Microsoft Word*, I found a useful shortcut for drawing boxes that use the IBM graphics characters.

First, outline the boxes using the _(underline) and | (vertical bar) keys. Next, use the replace menu to search for the underline, and replace it with ASCII 186. Then use the replace menu to search for the vertical bar and replace it with ASCII 205. (The ASCII characters are entered by holding the Alt key down and typing the appropriate number on the numeric keypad.) After the search and replace, you can enter the corners one at a time, again by holding the Alt key down and typing the number for the ASCII character. One note: avoid using the dash instead of the underline, since the dash is more likely to crop up in other text in your file.

Rick Liftig
Meriden, Connecticut

This trick should also work in any other word processor (e.g., XyWrite*) that recognizes the high-order character set when typed in using the Alt key and numeric keypad. It will not work in* WordStar *or other programs that use the high-order bit for their own purposes. (*WordStar *uses the high-order bit to determine microspace justification.)*—M. David Stone

BETTER USE FOR OUTLINERS

Like many writers, I've stayed away from outlining programs because they don't work the way I do. Recently I started playing around with a client's outlining program, however, and discovered that some of the best uses for outliners have nothing to do with outlining.

My most useful template to date is an appointment calendar. You create this by entering the months as level 1 entries, the days within each month as level 2 entries, and various classifications as level 3 entries. (I use TODO, APPOINTMENTS, and PHONECALLS.) Within each level 3 classification, include specific items as level 4 entries. You can then manage your calendar by using the outliner's ability to collapse, expand, move, and copy.

Marie Cesarini
New York, New York

This trick is particularly useful for outliners that have a memory-resident mode. If you run the outliner continuously in memory residence, you can get to it quickly when you need it.
—M. David Stone

SILENCE IS GOLDEN

Bulletin boards are usually busy, and listening to loud busy signals over and over again can be nerve-racking. The elegant solution is to turn off the modem's speaker through your software. For those who use *Crosstalk* and a Hayes-compatible modem, this is a simple task.

First, create a little file called SPEAKOFF.TXT, containing nothing but the single line

```
AT MØ <enter>
```

Next, insert the following into your *Crosstalk* .XTK file:

```
GO LOCAL
SEND SPEAKOFF.TXT
BYE
```

That's all there is to it. Here's a sample file, PC-IRS.XTK, that uses SPEAKOFF:

```
NAme        PC Magazine IRS
NUmber      (212) 696-Ø36Ø
SPeed       12ØØ
DAta        8
STop        1
PArity      None
GO          LOCAL
SEnd        SPEAKOFF.TXT
BYE
GO          RØ/45
ALarm       Ø NOW
ALarm
ALarm
```

The last three lines of the file tell *Crosstalk* to play a little tune when you connect, because with the modem's speaker off, you can't hear the connect tone.



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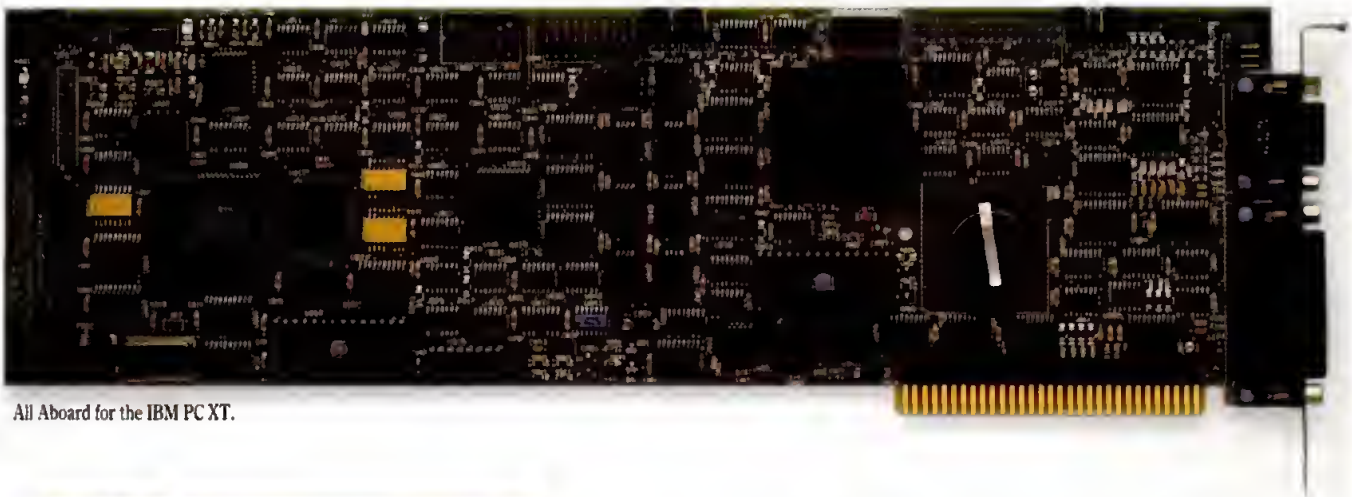
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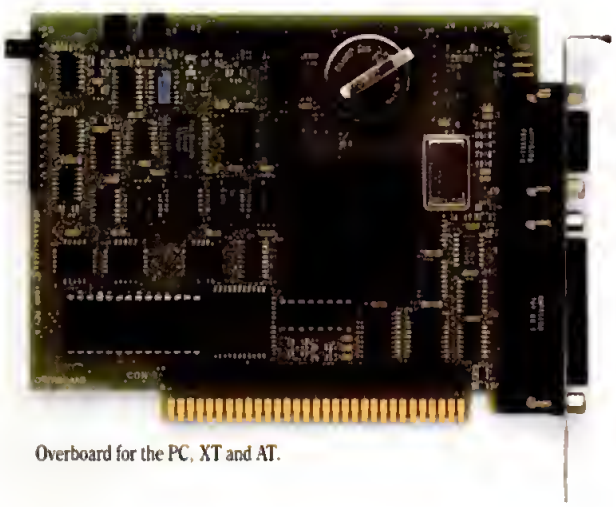
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All Aboard for the IBM PC XT.



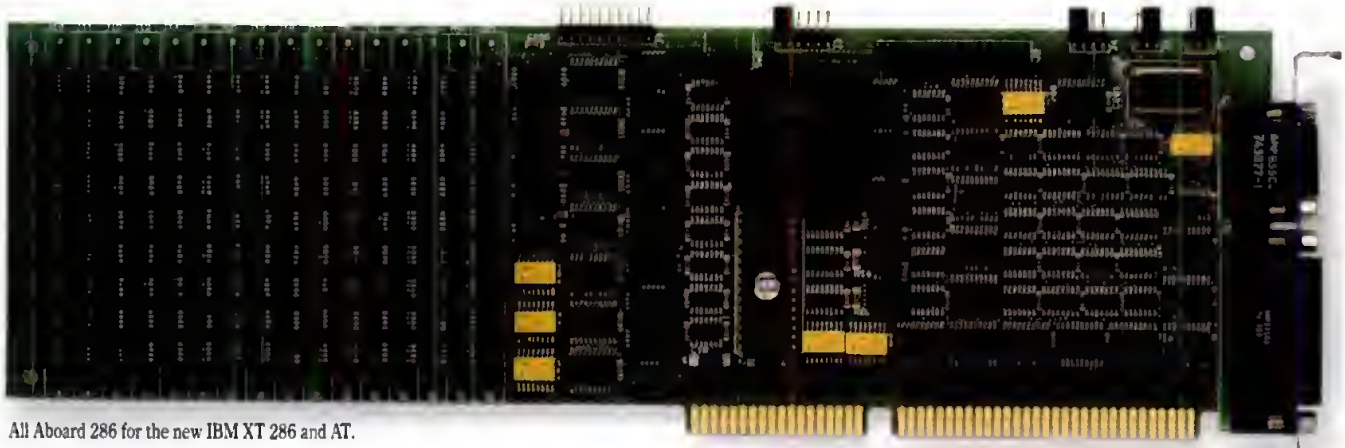
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CIRCLE 333 ON READER SERVICE CARD

■ POWER USER

To turn the speaker on, turn your modem off and on. Or turn the speaker on through software: create a file called SPEAKON.TXT; repeat the above steps using AT M1 instead of AT M0.

Scott Pakin
Chicago, Illinois

Even better, once you have the files SPEAKOFF.TXT and SPEAKON.TXT, create SPEAKOFF.XTK and SPEAKON.XTK. SPEAKOFF.XTK needs only the three lines that Mr. Pakin would add to other .XTK files, namely

```
GO LOCAL
SEND SPEAKOFF.TXT
BYE
```

SPEAKON.XTK only changes the second line—to SEND SPEAKON.TXT. With these two files, you only have to give the command to LOad one or the other to turn the speaker off or on. You can then run any other .XTK file without having to put these lines in each file.

Not so incidentally, turning the speaker back on by turning the modem off and on is questionable at best. Each time you flip the switch, you are sending a surge through your equipment, thereby shortening the life of your system. The software control is not only more elegant, it's the preferred route.—M. David Stone

■ Listening to loud busy signals over and over again can be nerve-racking. The elegant solution is to turn off the modem's speaker through your software.

VERSATILE NOTEPAD

Eric Baker's letter (Volume 5 Number 15) on using *SideKick*'s dialer to hold a chart of accounts for an accounting program reminded me of a similar technique I have been using for some time. I spend most of my time programming in Turbo Pascal, and often find that I need to look at one piece of code while working on another. I use *SideKick*'s notepad to hold the second file, and simply toggle the window on and off my screen with Ctrl-Alt.

The notepad has several advantages over the dialer in that its size and screen position are adjustable, its search features are more complete and flexible, and the cut-and-paste feature is directly available.

The idea of "windowing" nonwindowed applications is not limited to Turbo. In addition to Mr. Baker's suggested accounting application, this idea can be used with many word processors (to look at one document while editing another) or to allow convenient reference to on-disk documentation while running the program described therein.

Eric J. Woodhouse
Mill Valley, California

For Eric Boker's applicotion of listing o chart of accounts to search for account numbers, Mr. Woodhouse's opproach has one other advantoge: When you create a new account number, the notepad will let you type the new number directly into the file. The dioler will not. On the other hand, becouse the dioler's seorch function has fewer options, it requires fewer keystrokes to run o seorch. Try both opproaches ond see which one you prefer.
—M. David Stone

PROKEY, THE CPA

I use a general ledger program to manage my clients' finances. In Power User (Volume 5 Number 15), Eric Baker describes how to use *SideKick* to look up account numbers from within an accounting program. Although his approach is helpful, I use *ProKey* to avoid looking up account numbers altogether.

For example, instead of wasting time by looking in the Chart of Accounts for the Entertainment Expense account, I simply type Atl-E, which I have previously defined as a *ProKey* macro with the Entertainment Expense account number.

Some clients have frequent disbursements to the same vendor each month. In these cases I can really save time by using the macro to type the vendor's name and enter the account number automatically. Thus, for example, my SR macro automatically enters "Shop Rite supermarket <enter> 7400<enter>" into the accounting program. All I have to put in is the amount.

■ "Windowing" nonwindowed applications is not limited to Turbo. This idea can be used with many word processors.

Of course, you have to give your macros names that are easy to remember, but even if I had to name the macro "SHOPRITE" (*ProKey* allows up to eight characters), I would save time.

Thomas P. Skinner
North Massapequa, New York

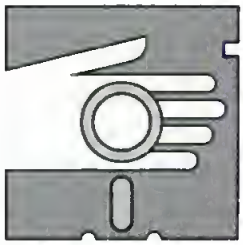
This approach to entering account numbers is potentially useful, but it has the drawback of forcing you to remember o large number of macro names. My own chart of accounts is too long (or my memory too weak) for me to rely on remembering the proper macro name for each account. It is certainly true that with ProKey, *you can always call up the list of macros, but then you have to search through them visually to find the one you need. With* SideKick*'s search function, on the other hand, you only have to remember o key word of the account to find the account number.*—M. David Stone

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■ PAUL SOMERSON

USER-TO-USER



A new, improved, smarter CHDIR command, a slate of powerful F3 techniques, and an easy DOS method to verify mass deletions one file at a time.

SPARE CHANGER

The DOS CHDIR command needs to be a bit smarter. I wrote a more intelligent version of it called CHD.COM, created by the CHD.ASM assembler code in Figure 1, or the BASIC CHD.BAS program in Figure 2.

CHD is almost identical to CHDIR except that it relaxes the requirements for the path specification. This means that if you omit the leading "\", CHD first tries to find the specified directory relative to where you are in the tree structure, just as CHDIR does. Unlike CHDIR, however, if CHD fails to find the subdirectory immediately below your current position, it makes a second attempt to find it just below the root directory.

For example, if you are in \MAIN\DBASE and you enter

```
CHD FORM
```

CHD will first try to change the current directory to \MAIN\DBASE\FORM. If this fails, it will then try to set the current directory to \FORM. If this second attempt fails, it will print the familiar "Invalid directory" message. Entering CHD followed immediately by a carriage return displays the current directory, just as with CHDIR.

I added a feature that allows you to change the current directory to the root by entering CHD followed by at least one space and then a carriage return. This was originally a bug that I decided was so handy that I left it in. To disable this feature, un-comment the "mybug:" line in the assembler source code.

```
;       title  : "CHD"
;       author : Stephen Barsky
;
; To assemble:
; MASM CHD;
; LINK CHD;   (ignore the No Stack message)
; EXE2BIN CHD.EXE CHD.COM
;

cseg    segment para public 'CODE'
;
        org     100h

        assume  cs:cseg,ds:cseg,es:cseg,ss:cseg

cd      proc    near
        mov     ah,47h          ; Get the current
        mov     dl,0            ;  directory path
        mov     si,offset path+1;   into
        int     21h             ;    PATH.

        xor     bx,bx           ; Load the number of
        mov     si,80h          ;  chere paseed to
        mov     bl,[si]         ;   thie program into BL.
        cmp     bl,0            ; If nothing, then display
        jz      saywhere        ;  current directory.

        add     si,bx           ; Else, make SI point to
        inc     si              ;  the trailing carriage return
        mov     byte ptr [si],0 ;   and replace the CR with a 0.

loop1:  dec     si              ; Search backwards from the
        cmp     byte ptr [si],20h; trailing CR (now a 0)
        jne     loop1           ;   until we hit a space character.

        inc     si              ; Point to first character of the
        cmp     byte ptr [si],0 ;  parameter.
;mybug: jz      anywhere        ; If it's the trailing 0, then display dir.
        mov     savestart,si    ; Else, save location of name.

        mov     dx,si           ; Try setting current directory
        mov     ah,3bh          ;  to specified
        int     21h             ;   path name.
        jnc     done            ; It worked!, were done.

        mov     di,offset path+1; Else, find the
        mov     cx,64           ;  trailing zero in the
        xor     ax,ax           ;   name of the current
        cld                     ;    directory and leave the
        repne   scasb           ;     value in DI (+1).
        mov     byte ptr[di-1],"\"; Replace zero with backslash.

        mov     si,offset path  ; Copy specified path name
        push    ds              ;  to the end of the
        pop     es              ;   current directory.
        rep     movsb           ;

                                                    (continues)
```

Figure 1: *CHD.ASM assembly language code to create CHD.COM.*



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■ USER-TO-USER

```
        mov     dx,offset path  ; Attempt to
        mov     ah,3bh          ;  change
        int     21h             ;  directory.
        jnc     done            ; It is, end we're gone!

; Look under the root directory

        mov     dx,savestart    ; Patch in the leading
        dec     dx              ;  backslash to the specified
        mov     si,dx           ;  path to see if
        mov     byte ptr [si],"\";  it's under the root.
        mov     ah,3bh          ; Attempt change of
        int     21h             ;  directory.
        jnc     done            ; It is, we're done.

; Else, give up.

        mov     dx,offset errmess; "We regret to inform you..."
        mov     ah,9            ; Display error
        int     21h             ;  message and
        mov     rcode,1         ;  set return code.

done:   mov     ah,4ch          ; Exit with return
        mov     al,rcode        ;  code.
        int     21h             ;

everywhere:
        mov     di,offset path+1; Set DI
        mov     cx,64           ;  to point to
        xor     ax,ax           ;  the trailing zero
        cld                     ;  in the path name.
        repne   scasb           ;
        mov     word ptr[di-1],0d0ah; Patch in a CRLF sequence.

        mov     ah,19h          ; Get the default
        int     21h             ;  drive and
        add     al,"A"          ;  save in
        mov     drive,al        ;  DRIVE.
        mov     dx,offset drive ;
        mov     ah,9            ; Display the
        int     21h             ;  current drive and
        jmp     done            ;  directory.

cd      endp

errmess         db      "Invalid directory",0ah,0dh,"$"
savestart       dw      0
rcode           db      0

drive           db      0
                db      ":"
path            db      "\"
                db      63 dup ("$")

cseg    ends
        end     cd
```

(Figure 1 ends)

```
180 ' Program for creating CHD.COM -- by Stephen Barsky
110 PRINT "Checking DATA statements; please wait..."
120 FOR B=1 TO 11:FOR C=1 TO 17:READ A$:IF C<17 THEN 140
130 Z#=Z#+VAL(A$)
140 NEXT:NEXT:IF Z#=10931 THEN RESTORE:GOTO 170
150 PRINT "WRONG NUMBER OF DATA STATEMENTS, OR AN ERROR"
160 PRINT "IN A BIG NUMBER AT THE END OF A LINE -- REDO!":END
170 FOR B=1 TO 11:FOR C=1 TO 16:READ A$:TTL=TTL+VAL("&H"+A$)
100 NEXT:READ S:IF S=TTL THEN 200
190 PRINT "DATA ERROR IN LINE";B*10+240;"-- CHECK AND REDO":END
200 TTL=0:NEXT:RESTORE:OPEN "CHD.COM" AS #1 LEN=1:FIELD #1,1 AS D$
210 FOR B=1 TO 11:FOR C=1 TO 16:READ A$:LSET D$=CHR$(VAL("&H"+A$))
220 PUT #1:NEXT:READ DUMMY$:NEXT:LSET D$=CHR$(92):PUT #1
230 FOR D=1 TO 63:LSET D$=CHR$(36):PUT #1:NEXT
240 PRINT "CHD.COM CREATED":CLOSE:END
250 DATA B4,47,B2,00,BE,B1,01,CD,21,33,DB,BE,00,00,0A,1C,1709
260 DATA 80,FB,00,74,60,03,F3,46,C6,04,00,4E,00,3C,20,75,1524
270 DATA FA,46,88,3C,80,89,36,AB,81,8B,D6,B4,3B,CD,21,73,1816
200 DATA 3D,BF,B1,01,B9,40,00,33,C0,FC,F2,AE,C6,45,FF,5C,2204
290 DATA 0B,36,AB,01,1E,07,F2,A4,BA,B0,01,B4,3B,CD,21,73,1763
300 DATA 1D,0B,16,AB,01,4A,0B,F2,C6,04,5C,B4,3B,CD,21,73,1703
310 DATA 0D,BA,97,01,B4,09,CD,21,C6,06,AD,01,01,90,B4,4C,1557
320 DATA A0,AD,01,CD,21,BF,B1,01,B9,40,00,33,C0,FC,F2,AE,2101
330 DATA C7,45,FF,0A,0D,B4,19,CD,21,04,41,A2,AE,01,BA,AE,1755
340 DATA 01,B4,09,CD,21,EB,D7,49,6E,76,61,6C,69,64,20,64,1721
350 DATA 69,72,65,63,74,6F,72,79,0A,0D,24,00,00,00,00,3A,990
```

Figure 2: *BASIC CHD.BAS program to create CHD.COM.*

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Another added feature is that CHD passes a return code that can be used by a .BAT file to determine whether that directory change actually worked. A return code of 0 means the directory change worked, while a return code of 1 means that the change failed.

I created CHD.COM for two main reasons. I have very few (if any) identically named subdirectories and am not interested in having to tell DOS exactly where to find everything. And the Backslash key on the Compaq Deskpro 286 is a long, one o'clock, right-hand-pinky stretch.

One note: Don't use this program unless you use a $P somewhere in your DOS prompt so that you know at all times exactly which directory you're in, or you'll end up very confused.

Stephen Barsky
Tustin, California

This does make it easier to amble through your subdirectory tree structure. But we've found the best navigation tools to be Charlie Petzold's VTREE visual tree display and his terrific BROWSE screen-popper, along with a gang of batch files to jump you around.

Every time we add or delete a subdirectory, we redirect the output of VTREE into a file called TREEPIC:

```
VTREE > TREEPIC
```

When we set up our hard disk, we created a batch file (in a directory we've pathed to) called T.BAT, which contains the single line

```
BROWSE TREEPIC
```

Typing T puts a hard disk subdirectory tree map on-screen in a flash.

And whenever we create a subdirectory, we also create a batch file (also in a directory we've pathed to) that simply contains the full pathname of the subdirectory with a CD\ prefix. So if we're adding a new directory called 1\2\3\4\5, we create one in our main \BIN directory called 5.BAT:

```
CD\1\2\3\4\5
```

Typing 5 jumps us directly into it.

We've received bags of mail from users who claim this is too wasteful, since each file, no matter how small, can take up 4K on an XT or 2K on an AT. Our feeling is that this is a small price to pay for ease of tree-hopping. The only alternative is to build one long batch file with a cascade of

```
IF %1==directoryname goto label
```

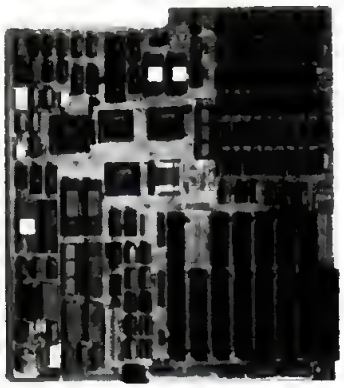
tests and a long list of appropriate CD instructions. This takes up less space but it's painfully slow, even on a RAMdisk. And of course, you can't use similarly named subdirectories, but that's another piddling

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price to pay for such convenience.

Interestingly, Microsoft, in its brand-new Learning DOS *on-disk DOS tutorial, recommends this technique, which we've been pushing for years.*

POWERFUL F3 TRICKS

When deleting all files from a directory, DOS doesn't display the names of the deleted files. To get a display of the files to be deleted, first type

```
DIR *.*
```

(or DIR *.BAK, etc., depending on what you're thinking of erasing). Then, if you're satisfied you want to erase everything, you can simply type

```
DEL
```

and hit the F3 key.

This procedure costs little in additional time, provides a list of files that will be deleted, and gives you a chance to avoid wiping out something you wanted to keep.

John M. Johnston
La Jolla, California

First of all, it is possible to have DOS check with you one file at a time before it deletes anything in a wildcard erase. More on that in a moment.

Most power users already know about the considerable muscle of the F3 key, which repeats the previous DOS command. You can use the F3 key in conjunction with the Ins and Del keys to adapt the previous command.

Even better, if you want to repeat a DOS command but want to do an intermediate DOS command before you repeat it, you can "park" the command you want to repeat by hitting the Ins key, typing in the intermediate command and adding an extra space at the end of it, hitting F3 to put the previous command at the end of the line, and then hitting Enter.

DOS will stop reading when it sees the extra space and will execute the intermediate command. Then you simply tap the Del key the correct number of times to erase the intermediate command, hit F3, and you have the original command back that you "parked." However, this works only with certain DOS commands that don't read switches off the command line.

Two other sterling uses of the F3 key are in verifying copies and deleting after copies are made.

If I want to copy all the .COM files from C:\DOS\BIN\UTILS to B:, I could type

```
COPY C:\DOS\BIN\UTILS\*.COM B:
```

To check whether the copies were valid, I would then type

```
COMP
```

and hit the F3 key. Since the COPY and COMP instructions are the same length

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and share the same command structure, this makes verifying the copies a painless process. (I could have added a /V switch to the end of the COPY command, but this doesn't do a real line-by-line or byte-by-byte comparison the way COMP or FC or a real compare program does.)

Another handy F3 technique is moving files from one subdirectory to another. If I wanted to move

```
C:\DOS\BIN\UTILS\COLOR.COM
```

to my current subdirectory, I could type

```
COPY  C:\DOS\BIN\UTILS\COLOR.COM
```

(and then COMP it if I wanted, by hitting COMP and then F3). Then I can delete the original by typing

```
DEL
```

and then tapping once on the space bar (since DEL is one character shorter than COPY) and then hitting F3 and Enter.

Of course, when moving, copying, and deleting files, it may be better to run the operation out of batch files.

And speaking of batch files, here are two related ones that let you delete files selectively. They'll display the files you want deleted and offer you the chance to delete them or leave them alone. The only strictly non-DOS part is a tiny GETYES.COM atility by Robert J. Holmgren published in User-to-User (Volume 5 Number 8) that handles an IF ERRORLEVEL branching operation. First, create a batch file called DELETE.BAT:

```
ECHO OFF
IF %1!==! GOTO OOPS
FOR %%I IN (%1) DO COMMAND /C D %%I
GOTO END
:OOPS
ECHO Enter a filespec (like *.COM)
:END
```

Then create a companion batch file called D.BAT:

```
ECHO OFF
ECHO Delete %1 (Y/N)?
GETYES
IF ERRORLEVEL 255 GOTO DOIT
ECHO %1 NOT deleted...
GOTO END
:DOIT
DEL %1
ECHO %1 deleted...
:END
```

To make this work, you'll also have to create GETYES.COM. To do so, type in the GETYES.SCR script below using the DOS COPY CON command or any pure-ASCII word processor. Make sure you leave a blank line after INT 21 and hit the Enter key after each line, especially the last one. Then put GETYES.SCR and DEBUG on your disk and at the DOS prompt type DEBUG < GETYES.SCR.

```
A
MOV AH,00
INT 16
CMP AL,59
JZ  010C
CMP AL,79
JNZ 010E
MOV AL,FF
MOV AH,4C
INT 21

N GETYES.COM
RCX
12
W
Q
```

(To use N and n rather than Y and y to trigger ERRORLEVEL, substitute 4E and 6E for 59 and 79, and change GETYES.COM to GETNO.COM.)

This may seem like a lot of files and a lot of typing, but it can save you lots of anguish. To use it, just type DELETE followed by a filespec (such as C.* or *.COM). The batch files will display the names of all matching files one by one and ask whether or not you want to delete them. If you answer Y (or y) the file will be erased; an N (or n) will skip over a file without erasing.*

■ A handy F3 technique is moving files from one subdirectory to another.

SHARE YOUR DISCOVERIES

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■ EDITED BY CHARLES PETZOLD

PC TUTOR



Changing the shifted-state byte in the BIOS; keeping shift states coordinated with keyboard LED indicators; using multiple partitions on a hard disk.

SHIFTING THE KEYBOARD

In a program I'm writing I'd like to turn CapsLock or NumLock on or off at various times from within the program. For instance, if the program needs number input at some point, I'd like to turn on NumLock so the number pad is usable. How do I do something like this?

Jonathan A. Michaels
New York, New York

A single byte containing all shift state information is maintained by the PC's BIOS. If you just need to look at this byte, you can get it by making an INT 16h call with AH equal to 2. In most programming languages it's easier to fish it out of memory yourself. If you want to change it, you must directly access the byte. It is located at hexadecimal address 40:17. (This is documented in the BIOS listing in any of IBM's PC, XT, or AT Technical Reference *manuals.)*

Each of the 8 bits in this byte refer to the state of a different shift key. If you think of bit 7 as the leftmost (or most significant) bit and bit 0 as the rightmost bit, here's what the 8 bits mean:

Bit	A 1 means that:	OR Mask	AND Mask
7	Insert is on	80	7F
6	CapsLock is on	40	BF
5	NumLock is on	20	DF
4	ScrollLock is on	10	EF
3	Alt key is down	08	F7
2	Ctrl key is down	04	FB
1	Left Shift is down	02	FD
0	Right Shift is down	01	FE

The "OR Mask" is a hexadecimal value that you can use to turn the shift state on. The "AND Mask" is a hexadecimal value that turns it off. For instance, if you want to turn on NumLock, you would need to retrieve the shift state byte from memory, perform a logical OR with the hexadecimal value 20 (to turn the bit on), and store the value back into memory.

You can manipulate these bits in any programming language that allows you to access memory in segments outside your program. In BASIC, you'd use DEF SEG, PEEK, and POKE. In Turbo Pascal, you'd use the MEM array. In assembly language or C, you'd use a far pointer.

Let's look at some examples. In a BASIC program, this code will turn on NumLock:

```
DEF SEG=&H40
POKE &H17, &H20 OR PEEK (&H17)
```

■ A single byte containing all shift state information is maintained by the PC's BIOS. If you want to change it, you must directly access the byte.

In Turbo Pascal:

```
Mem [$40:$17] := Mem [$40:$17] OR $20 ;
```

In assembly language:

```
PUSH DS
MOV  AX, 40h
MOV  DS, AX
OR   BYTE PTR DS:[17h], 20h
POP  DS
```

In C:

```
* (char far *) 0x400017 |= 0x20 ;
```

This last example assumes that your C compiler implements the "far" keyword the same way as Microsoft C, Versions 3 and 4. In all these examples I've used hexadecimal addresses and values. Note how each of these languages uses a different notation for hexadecimal.

To turn NumLock off, you can use similar code except that you want to set the bit to zero. In all the examples above, replace 20 with DF. (In the assembly example, preface DF with a 0.) In the BASIC, Turbo Pascal, and assembler examples, replace OR with AND. In the C example, replace the OR operator (|) with an AND operator (&).

Changing the keyboard shift states from within a program is not always a good idea. Even Lotus's 1-2-3 *doesn't turn off NumLock. It will tell you about it and request that you turn it off, but it won't turn it off itself.*

You will also find that some people will not be happy at all with shift states that magically change. Let me introduce you to one of them. Mr. Michaels, meet Mr. Eiser:

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■ PC TUTOR

KEYBOARDS OUT OF SYNC

I've been plagued by a nuisance problem when using my Compaq with a Keytronic KB 5151 keyboard. From time to time my CapsLock key or NumLock key becomes mysteriously reversed. The light says that CapsLock is on, but what I type is in lowercase. If I press the CapsLock key so the light goes off, I'm now typing in uppercase. What's the problem here, and what can I do about it?

V. J. Eiser
Montreal, Quebec
Canada

The shift state LED you see on your keyboard and the shift state that the PC's BIOS maintains start off the same, but they are entirely independent. The keyboard itself keeps track of the shift state for the light, but there is no feedback from the BIOS back to the keyboard. It's very likely that one of the programs you run has some code in it that changes the shift state stored by the BIOS. (Techniques for doing this are shown in response to the question above.) The keyboard and the BIOS are then out of sync.

This can't happen with the IBM PC AT (and newer IBM PC-XT) keyboards. The LEDs in these keyboards are controlled by the BIOS. So on these machines if a program changes one of the shift states, the light also changes.

Here are two small programs that will let you get the lights and the BIOS back in sync. First, load DEBUG and type in the following lines:

```
N REVCAPS.COM
A
MOV AX,4Ø
MOV DS,AX
XOR BYTE PTR [17],4Ø
RET

R CX
B
W
Q
```

Now you have a program called REVCAPS that reverses the BIOS CapsLock state to get it back in sync with the keyboard.

This one, designed to switch NumLock, is similar:

```
N REVNUM.COM
A
MOV AX,4Ø
MOV DS,AX
XOR BYTE PTR [17],2Ø
RET

R CX
B
W
Q
```

HARD DISK PARTITIONING

I've seen some articles recently about partitioning hard disks. From what I understand, partitioning allows you to put two or more different operating systems on your hard disk. How does this work, and how do you get the machine to boot with your choice of operating system?

J. Dean Blaich
San Jose, California

One advantage of the open architecture of the IBM PC is that the machine is not limited to a single operating system. Obviously, most PCs and compatibles never run anything except Microsoft's MS-DOS. (The version of MS-DOS that IBM sells is called DOS by IBM and is often referred to as PC-DOS. It's still MS-DOS.) Some of the other operating systems available for the PC are Digital Research's CP/M-86 and Concurrent PC-DOS, Microsoft's Xenix, and IBM's PC-IX.

When you first turn on your PC or reboot with Ctrl-Alt-Del, the ROM BIOS goes through a checkout and initialization procedure. The BIOS then attempts to load into memory the first sector of the first surface of the first track of the floppy disk in drive A:. The first sector on a floppy disk contains a small program (less than 512 bytes) called a "bootstrap loader." If the floppy disk is boatable, the bootstrap loader loads the rest of the operating system into memory. The operating system is effectively pulling itself up by its own bootstraps, which is why a system reset is called a boot.

On a hard disk system, the BIOS first attempts to boot from drive A:. If drive A: does not contain a disk or the drive door is open, the BIOS then tries to boot from the hard disk. Again, it reads into memory the first sector of the first surface of the first

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■ PC TUTOR

cylinder of the hard disk. If this sector contained a bootstrap loader such as the one on a diskette, the hard disk could accommodate only one operating system.

Instead, however, the first sector on a hard disk contains another small program (let's call it the "partition loader") and some partition information. The format of this partition information is documented in IBM's DOS Technical Reference *manual. Only 16 bytes are required for each partition. These 16 bytes contain a code to identify the operating system, the starting and ending sectors of each partition on the hard disk, and which partition is bootable.*

The partition loader searches through the partition information to determine which partition is marked as bootable. Each partition contains its own bootstrap loader in the first sector of the partition. So, all the partition loader need do is load the bootstrap loader for the bootable partition and then let the bootstrap loader take over.

In summary, for a floppy disk, the BIOS loads the bootstrap loader, and the bootstrap loader loads the operating system. For a hard disk, the BIOS loads the partition loader, the partition loader loads the bootstrap loader for the bootable partition, and the bootstrap loader loads the operating system.

The FDISK program that comes with PC-DOS allows you to divide a hard disk into one, two, three, or four partitions. Each of these partitions can accommodate a different operating system. Most people use the whole hard disk for DOS and thus have only one partition on the hard disk. When you first get an XT or AT with a hard disk, you must use FDISK to define a DOS partition even before you use FORMAT. (Often this is done by the computer store, so if you're using a hard disk and have never used FDISK, don't worry.)

If you use FDISK to define more than one partition on your hard disk, FDISK lets you mark one (and only one) of these partitions as "active," which means that it's bootable. If you boot from the hard disk, the operating system in that partition will be the one that comes up.

With a partitioned hard disk you have a couple of methods by which to choose one operating system over another when you boot up your machine:

- *Even if the DOS partition is not marked as bootable, you can still access it if you boot DOS from a floppy disk. So, if you have two partitions on your hard disk—DOS and something else—you could use the DOS partition if you boot DOS from a floppy disk and the "something else" partition if you boot from the hard disk. The choice would depend upon the drive A: door being open or not.*

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■ PC TUTOR

■ Experimenting with partitions is best done with a clean hard disk.

• *Or, you could boot up DOS from a floppy disk, use FDISK to change the partition, then reboot from the hard disk. This is fairly fast and if you do it a lot, you may want to set up a special disk that calls FDISK from an AUTOEXEC.BAT file.*

• *Microsoft's Xenix System V (which IBM licenses and sells as Xenix 2.0) has another method. If Xenix and DOS occupy two different partitions on a hard disk and Xenix is marked as bootable, then booting from the hard disk always brings up Xenix. But Xenix then lets you specify that you want to boot DOS instead. That's nice.*

• *Or, the partition loader in the first sector of the hard disk could be fancied up a bit by an alternate partition loader program. This program could put a menu up on the screen that lists the different operating systems available on the hard disk and asks you for your selection.*

Some words of caution: Experimenting with hard disk partitions is best done with a clean hard disk or a hard disk with disposable data. Changing the size of the DOS partition with FDISK wipes out the DOS partition (or at least the FAT and directory information). FDISK will warn you about this. Heed the warning.

If you want to take a look at the partition information, you cannot *use DOS interrupt 25h, or the DEBUG L (Load) command, or any "disk look" utility that uses interrupt 25h. (Many do, nowadays.) This is because interrupt 25h can only get at the DOS partition. To look at anything outside the DOS partition, you'll need to use interrupt 13h (or a "disk look" program that uses interrupt 13h).*

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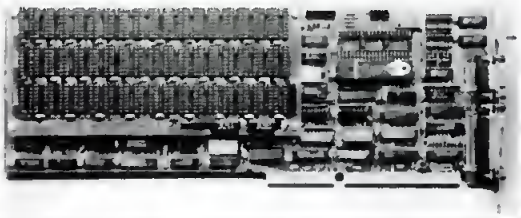
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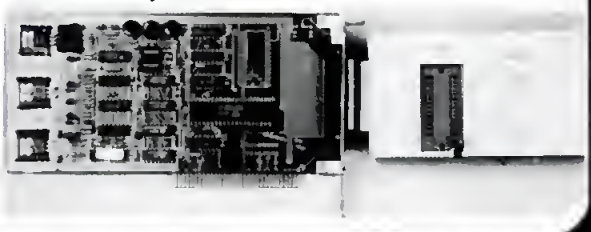
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Ctrace



The perfect companion for MIX C has arrived. MIX C makes it easy to write C programs. Now Ctrace makes it easy to get them working. Introducing Ctrace, the exciting new C source debugger with animated trace.

FUN AND EASY

Ctrace makes it so easy to debug your C programs that you'll love doing it. You no longer have to mess with assembly language or hex addresses. Ctrace presents your program in a form that's instantly familiar. Your C source code is displayed just as you wrote it. All your variables are displayed just as you named them. And wait till you see your program in action. Ctrace brings it to life on the screen. You'll see your variable values changing as you watch your source code executing. Ctrace shows you how your program works, or why it doesn't work. After one session with Ctrace, you'll wonder how you ever programmed in C without it.

UNIQUE ANIMATED TRACE

Ctrace has a unique animated trace feature that shows you the flow of execution in vivid detail. Not just line by line, but statement by statement. It's like watching the bouncing ball as the cursor moves over your C source code, highlighting each statement as it executes. Press the space bar to execute one statement at a time, or press the return key and watch it go. It's exciting and educational. Who says learning has to be boring?

SIMPLE OPERATION

Ctrace is easy to operate too. Commands are executed with a single keystroke. Help screens are available if you forget a command. Pop up menus list command options. You simply position the cursor to the desired option and press the return key. Pop up messages alert you when anything important happens. To use Ctrace, simply compile your program with the trace option turned on. The executable program file is created as normal. Ctrace doesn't affect the size or the behavior of the program. You can execute your program with or without the help of Ctrace.

4 VIEWS AT ONCE

Ctrace maintains 6 windows of information: source, output, variables, watch, symbols, and memory. You can view as many as 4 windows at the same time. The source window (top left) shows your C program. The output window (bottom left) shows the screen output from your program. The variable window (bottom right) shows all the variable names and values. The watch window (top right) shows the variables that you select along with any conditions you've defined. The symbols window shows the addresses of variables and functions. The memory window shows any area of memory using data types that you select. Eight different screen layouts are available at the touch of a key. You can even define your own screen layouts.

COMPLETE PROGRAM CONTROL

Ctrace gives you complete control of your program. Execution options are single step, trace speed, and full speed. You can insert breakpoints on an unlimited number of statements. Execution is temporarily halted when a break point is hit. You can then snoop around and see what your program has done to that point. You can even trace the flow of control backwards to see how your program got there. You can insert watch points on variable values. When the value of a variable satisfies the conditions you've defined, execution halts to let you examine your program. You can trace all functions or select just the ones you want to see.

THE RIGHT PRICE

If you could buy a debugger like Ctrace anywhere else you would expect to spend major bucks. Fortunately nobody else has a debugger like Ctrace. It's only available from MIX Software. And that's great news because you know our prices are right. Ctrace is an incredible value at only $39.95. That's Right.

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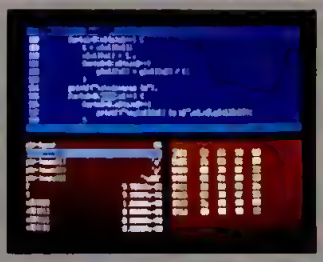
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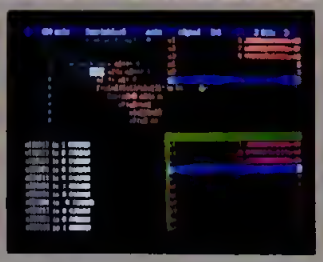
Source window with profile count showing number of times each statement has executed Pop up message indicates break point has been hit



Source and variables windows shown side by side Pop up message indicates that a watch point condition has been satisfied



Source variables and memory window Memory window lets you view any area of memory using any data type



Change colors to suit yourself Ctrace works with monochrome color Hercules and EGA cards Works on IBM compatibles and any computer with an IBM compatible BIOS

C for yourself

THE C COMPILER

You can see that Ctrace is not your typical debugger It's easy to understand and simple to operate. Likewise. MIX C is not your typical C compiler It's small and fast In fact it's the only full feature C compiler that can be operated comfortably on floppy disks. And as you would expect, MIX C is easy to use It produces a complete program listing with all errors clearly identified and explained

Although it's small. MIX C is not a subset MIX C supports the full K&R standard, including the extensions that are often omitted in other C compilers. MIX C comes complete with a comprehensive 460 page book. a library of more than 175 functions, a blazingly fast linker. and tools for optimizing your programs for minimal space or maximum speed All of this is yours for the incredibly low price of $39.95. That's little more than the cost of most C books alone

If you're just learning C, MIX C is your fastest. easiest, and cheapest way to master the language If you've been frustrated by other C compilers. don't throw in the towel until you've tried ours There's a world of difference Our book includes a well written tutorial with lots of example programs Our compiler includes the machine specific functions you need so you won't have to write them yourself Compile and link operations take half as long with MIX C. That means you'll get your programs up and running twice as fast

THE ASM UTILITY

Our ASM utility is available if you want to link assembly language functions to your C programs It works with Microsoft's MASM or M80 assemblers Macros make it easy! You can call assembly language functions just like C functions You can even call C functions from assembly language Lots of useful assembly language functions are included as examples. And the price is right at only $10.

THE SPLIT-SCREEN EDITOR

Another great companion to the MIX C compiler is our split-screen editor. It makes writing programs even faster and easier. With the MIX Editor. you can compile. link. and execute your program at the touch of a key Compiling is fast because the MIX C compiler reads the program directly from memory Correcting errors is easy because the editor automatically positions the cursor to the first error in the program

The MIX Editor works just like Micropro's WordStar® But through the magic of macros you can create your own custom version You can map any key to any command. You can even define your own commands using the 100+ predefined commands The split-screen feature is great for programming You can edit two files at the same time and move text between files It works great with any language. It has automatic line numbering for BASIC. It has auto indent for structured languages like Pascal and C It even has fill and justify for English All these features and more are yours for the incredibly low price of $29.95.

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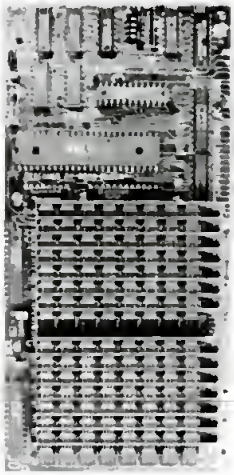
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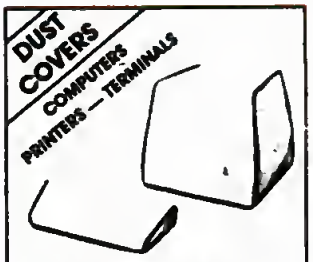
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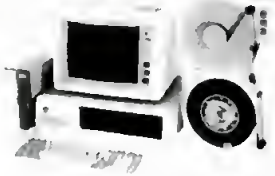
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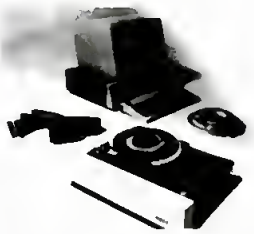
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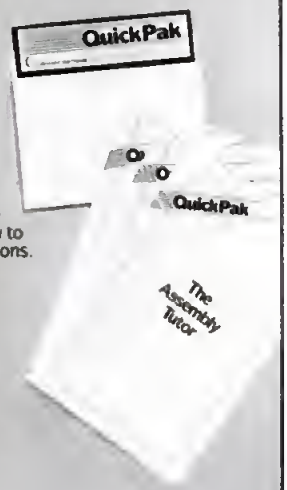
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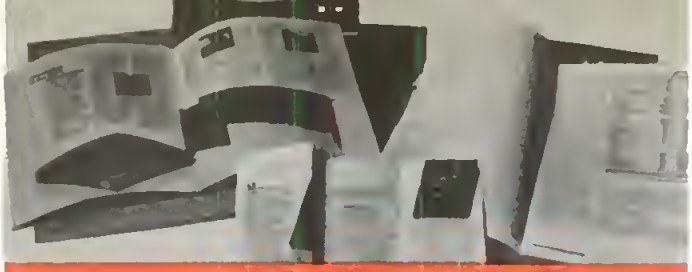
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1) For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (check all that apply)

Hardware
- a ☐ Mainframe
- b ☐ Mini
- c ☐ PC
- d ☐ Printers/Plotters
- e ☐ Monitors
- f ☐ Terminals
- g ☐ Modems
- h ☐ Hard Disk/Tape Back-up
- i ☐ Add-in Boards
- j ☐ LANS
- k ☐ Micro-Mainframe Links

Software
- l ☐ Communications
- m ☐ Accounting
- n ☐ Spreadsheets/Financial Planners
- o ☐ Project Managers
- p ☐ Word Processors
- q ☐ Database Managers
- r ☐ Graphics

2) Your primary job function is (check)
- s ☐ Administrative/General Management
- t ☐ MIS/DP Communications Systems Programming
- u ☐ Engineering/R&D
- v ☐ Finance/Accounting
- w ☐ Marketing/Sales

3) Next step after information is received:
- x ☐ Purchase Order
- y ☐ Evaluation
- z ☐ Specification/Recommendation

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Company _____ Title _____

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PC MAGAZINE

COMING UP

BUSINESS GRAPHICS SOFTWARE Eye-catching graphics go a long way toward enhancing any business presentation. On the other hand, no matter how eye-catching, no business presentation is complete if it fails to effectively communicate what the numbers mean. Business graphics software is the premier way to do both. It has the potential to increase the informational value and the dramatic impact of any presentation, particularly now that high-resolution monitors and enhanced graphics adapters are penetrating the market in such a big way.

That's why *PC Magazine* is devoting an entire issue to business graphics software, over 50 packages that can chart your numbers, animate your presentations, and meet your special needs.

Naturally, not all the programs have all these capabilities or execute them equally well. Our comprehensive, information-packed features table gives a quick read on which packages deliver the highest quality and performance for the dollar. The reviews go into greater depth and provide sample output—both draft and high quality—to help you evaluate your choices.

ANIMATED PRESENTATIONS Going beyond the basics of dedicated charting packages, contributing editor Winn L. Rosch takes a look at animated presentation software, while contributing editor Glenn Hart examines specialized graphics products that provide the quick and clean solution to specific business needs, such as flowcharts.

FILM RECORDERS We round out this special business graphics blockbuster issue with a review of three new film recorders: hardware for producing professional slides from PC-prepared graphics software presentations. In addition, frequent contributor Robin Raskin offers a consumer's guide to slide service bureaus that turn your computer-generated graphics into long-lasting, reusable material. PC

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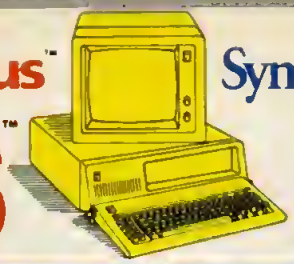
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